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MEDICINE AND THE MEDICAL AGE

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OF

Practical Therapeutics

EDITED BY

H. A. HARE, M.D.,

Professor of Therapeutics and Diagnosis in the Jefferson Medical College,

GENERAL THERAPEUTICS;

AND

EDWARD MARTIN, M.D.,

Professor of Surgery in the University of Pennsylvania,

SURGERY AND GENITO-URINARY THERAPEUTICS.

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ORIGINAL COMMUNICATIONS.

RETROVERSION OF THE UTERUS: ITS PREVENTION AND CURE.

BY EDWARD P. DAVIS, A.M., M.D., F.A.C.S.,

Professor of Obstetrics in the Jefferson Medical College, Philadelphia.

Retroversion of the uterus may be congenital or acquired. When congenital it is frequently accompanied by retroflexion. This condition rarely causes symptoms when no other abnormal state is present unless pregnancy occurs. Retroversion and retroflexion of the uterus are often found together in ill-developed, badly nourished patients, and such may suffer from disorders caused by the general bad state of health.

Where infection and inflammation of the pelvic organs have occurred, a retroverted and retroflexed uterus may be so bound by adhesions as to give great pain and distress to its possessor; but in these cases the history of the infection will direct attention to the pathological condition present.

A simple case of retroversion and retroflexion in a healthy patient who has no suffering or inconvenience resulting from this condition requires no treatment. It is often wise not to tell the patient that such a condition is present unless it demands attention. Cases are often seen where healthy, vigorous women have done hard work, taken vigorous exercise, and been in excellent health when retroversion and retroflexion were both present without other abnormal conditions.

When pregnancy occurs in a woman having a retroverted and retroflexed uterus, the womb will unfold and develop with difficulty, and symptoms will speedily develop. Such are pain in the back, low down across the sacrum, irritability of the bladder, constipation and irritability of the bowel, disordered menstruation, and general fatigue. Reflex disturbance of the stomach is not uncommon and may be ascribed to some gastric disease if the diagnosis of pregnancy has not been made.

A considerable number of these cases go on to spontaneous cure as pregnancy develops. The uterus gradually straightens its abnormal curve, rises out of the pelvis, and gradually ceases to make pressure upon the neck of the bladder and upon the bowels. Whether this occurs or fails to develop depends largely on the mode of life and habits of the patient. If she takes little or no exercise, wearing a corset with steel bands in front, which makes strong pressure on the abdomen, if she is habitually constipated, and ill-developed, the uterus may fail to right itself, and abortion or incarceration may result.

Abortion is a frequent occurrence among these patients, and is of the utmost importance to the woman because it gives a favorable opportunity for a great improvement in her general health.

In the treatment of abortion, in general, practice is divided into two schools. First are those who consider abortion a trivial affair, requiring no treatment except possibly a few days' rest in bed. The busy general practitioner without especial training and facilities is often content to treat his cases of abortion in this manner. But if such

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cases be studied thoroughly, each abortion has a cause, and the good health and reproductive power of the patient will depend upon the recognition, and if possible the permanent removal, of this cause.

The second line of treatment of abortion is that pursued by obstetricians with hospital facilities and special training. This consists in the thorough investigation of each case with a view of ascertaining its cause and removing it if possible. Cases of retroversion and retroflexion aborting have thorough vaginal examination, are, if possible, taken to hospital or given hospital facilities at home, and are treated by anesthesia, thorough dilatation of the uterus with the solid dilator, curetting with a large blunt-ended curette, and packing with ten-per-cent iodoform gauze. The uterus is carried up in the pelvis by a vaginal packing of bichloride gauze. This gauze is removed in forty-eight to seventy-two hours, and during her convalescence the patient takes the knee-chest posture night and morning. While this treatment will not in some cases permanently correct the abnormal flexion, it will first rescue the patient from the danger of septic infection and retained portions of the ovum, and, second, will do much to improve the condition of the uterus. From both these circumstances a succeeding pregnancy is much more likely to be successful.

When pregnancy occurs in a retroverted and retroflexed uterus and abortion does not develop, if infection takes place the uterus may be bound down in the pelvis by adhesions, the ovum may die, and incarceration of the uterus and septic infection develop. This is a condition of great danger and calls for skilful surgical treatment. The most experienced obstetricians under these circumstances have been obliged to resort to extirpation of the uterus to save the life of the patient.

When pregnancy occurs in a retroverted uterus treatment is addressed to two ends: to restore the uterus to its normal position and to continue the pregnancy. It must be kept in mind that violent manipulation in replacing the uterus will produce abortion, and hence whatever measures are used to replace the womb must be carried out with caution. If such a patient be kept in bed, lying upon her side, and is made to empty the bladder at regular and frequent intervals, ninety out of a hundred of such cases will result in the spontaneous replacing of the womb. This treatment, however, is indefinite, tedious, and unsatisfactory to the patient, and hence more active measures must be employed.

Of primary importance is the knee-chest posture both for manipulation and for the treatment of such a case. This can only be taken to advantage when all constriction is removed from the waist and the abdominal viscera are absolutely free to move within the body. In addition to this precaution the vagina must be distended with air to its fullest capacity. Women who have borne children, in whom the entrance to the vagina is relaxed, can often take the knee-chest posture to advantage without help, but others require assistance in opening the vagina to make the knee-chest posture successful. Air may be admitted by separating the vulva by the two hands of an assistant, or if the patient has no help, by instructing her to insert a small cylindrical rubber speculum within the vagina before she assumes the knee-chest posture. If such a speculum be kept absolutely clean and anointed with a boracic acid ointment before insertion, there is little danger of infection or injury.

When a physician is called upon to examine such a case, the examination should first be made with the patient lying upon her back at the edge of a bed or table. The position of the uterus can then be accurately made out and some idea can be obtained of its mobility. No effort should be made to replace the uterus with the woman in this position because pressure will only force the womb back against the sacrum and may produce injury.

After the diagnosis has been made the patient should be put in the knee-chest posture, clothing having been completely loosened, or the heavier clothing having

been removed. Two fingers should be inserted within the vagina and the posterior vaginal wall carried strongly upward and backward. By inserting the longest fingers pressure can then be made upon the retroverted fundus and an effort made to carry this up above the pelvic brim. Remembering that there is space at each side of the promontory of the sacrum, the fundus may be guided to one or the other of these landmarks. By gentle but steady pressure the fundus can usually be carried up above the pelvic brim.

If the patient is more than three months advanced there is not much danger that the uterus will again become retroverted. If she is in the earlier months it may be necessary to sustain the uterus in its normal position for some time.

The use of pessaries during pregnancy is rarely necessary and may result in injury. Two kinds are best: the retroversion Hodge pessary or the rubber ring. The Hodge pessary may be covered with soft rubber, and some have a large soft-rubber posterior bar which prevents injurious pressure. The ring pessary should be a spiral, also covered with soft rubber. While the patient is wearing the pessary the vaginal douche of a saturated boric solution at a temperature of 110° F. should be taken at least once daily. Should the pessary give pain or distress it must at once be removed.

In cases in which the uterus does not go readily into normal position it may be necessary to restore it very gradually. For this purpose the patient should remain in bed and should empty the bladder at frequent and regular intervals. There is no objection to her going to a bath-room. The bowels must be kept free from constipation, and fecal matter must not be allowed to accumulate in the lower bowel. To aid in restoring the uterus gentle but continuous pressure may be made by tampons of carded lamb's wool, sterilized and soaked in a one-per-cent lysol solution. These tampons should be made to fit each case, but usually a tampon in the shape of a roll from two to four inches long and once or twice as large as the ordinary chemical test-tube should be employed. A piece of sterile silk suture should be tied firmly about the middle of the tampon for its withdrawal. Tampons should be smeared with an ointment containing ten grains of soda biborate, three drachms of lanolin, and white vaselin to make one ounce. To insert the tampon, the patient having first emptied the bladder, she should assume the knee-chest posture, and the larger blade of a Sims speculum should be inserted and the posterior vaginal wall drawn strongly upward and backward. In the grasp of dressing forceps the tampon can readily be carried along the speculum high on the posterior vaginal wall. The speculum is then withdrawn and the physician may adjust the tampon with the fingers. The tampon may be allowed to remain thirty-six to forty-eight hours, removed, and a gentle vaginal irrigation of lysol, one per cent, is to be given, followed by the insertion of another tampon. Should the pressure of the tampon give pain and distress it must at once be removed.

It is often impossible to carry out this treatment successfully unless the patient is in the care of a trained nurse. Such treatment requires great patience on the part of the woman, for weeks may be required to bring about a successful issue. If care and gentleness be exercised the results are usually good.

Where it seems difficult to fit a tampon, a strip of surgeon's lint, three or four inches wide, which has been boiled in one-per-cent lysol solution and smeared with a boric ointment, may be introduced as a tampon in the manner already described. The posterior vaginal wall should be firmly but moderately distended, and pressure made in such a way as to raise the fundus and at the same time carry the cervix backward.

What has been said may be illustrated by the brief narration of cases.

A woman who had borne one child had missed several menstrual periods during the summer, and lingered at the seashore later than usual. She was taken with pain and slight bloody discharge. A physician ex-

amined her, finding a pregnant retroverted uterus, and advised her to return to her home in the city at once. She was immediately brought by ambulance. Abortion did not develop; the patient was put in bed under the care of a nurse and the treatment by tampons carried out. After some weeks the uterus was replaced and the patient went successfully to term.

An exceptionally vigorous young woman had been fond of athletic sports and especially of tennis. She had never been ill, never had backache or disability of any sort. Conception occurred shortly after marriage, and after two months pain in the back and very slight discharge developed. Examination showed a retroverted pregnant uterus. This was replaced by the methods described.

It was impossible to ascertain any cause for this retroversion, nor could it be traced to a strain, fall, or an acute condition. The most reasonable inference has been that it had existed for an indefinite time and that pregnancy first made it evident.

A widow suffered from disorders of digestion and was treated by a medical man for gastritis. Her vomiting and inability to retain food became severe. A pelvic examination was suggested, when a retroverted pregnant uterus was found. The patient was immediately removed to hospital and efforts to replace the uterus failed. Accordingly pregnancy was interrupted, but the woman died of toxemia.

We may summarize our practical knowledge of retroversion and pregnancy as follows:

The tendency is to recover if the patient will avoid constriction of the abdomen and will take regularly the knee-chest posture and avoid distention of the bladder. If the corset cannot be given up the patient must be taught how to apply it. She should lie upon her back upon a firm bed or table or upon the floor, the corset adjusted but not drawn together. The pelvis should then be raised by bending the legs and raising the hips with the heels on the floor. The corset should be fastened at the *lower end first* and the abdominal viscera carried up and not down. In this way injurious corset pressure is reduced to the least possible degree. If the patient can be persuaded to abandon the corset, clothing must be supported from the shoulders by a suitable waist.

If these simple measures do not suffice, then rest in bed, the use of the tampons, knee-chest posture, and other precautions described must be carried out.

Should this fail the physician must not resort to the interruption of pregnancy too rapidly. When symptoms of fixation of the uterus with threatened infection or inflammation develop, delay should cease. The patient should go to hospital, and under a thorough anesthesia an effort should be made to dislodge the uterus and carry it above the pelvic brim. Care must be taken not to rely upon anesthesia by oxygen and nitrous oxide, for many patients are not completely relaxed by this combination. Ether and oxygen are much more efficient.

If there is evidence of previous appendicitis or other inflammatory affection of the pelvic viscera, the question may be seriously considered whether it is not best to open the abdomen, deal with conditions found as indicated, and endeavor to bring up the uterus after loosening the adhesions. This has in some cases been done and the pregnancy has gone to full term.

Should it be decided not to interfere surgically, and efforts fail to replace the uterus, pregnancy must be interrupted by anesthesia, dilatation, curetting, packing, and drainage, with the gradual replacing of the uterus by vaginal antiseptic packing.

One must not forget, in cases complicated by infection and death of the embyro, that it may be necessary to extirpate the uterus, leaving the vagina widely open for drainage. The patient should be placed in the Fowler position and salt solution used by the drip method.

Retroversion of the uterus occurring after labor is one of the most common disabilities of women and has long been the subject of study by the profession. One

cannot understand its development without reference to the anatomy of the uterus. It must not be forgotten that the essential characteristic of the uterus is its mobility. In the non-pregnant condition its position varies with the full or empty state of the bladder and bowel. The uterus does not rest upon a support in the sense that an object rests upon a table, but is contained in the two broad ligaments which act as swings and permit mobility. The position of the uterus as regards anteversion and retroversion depends largely upon the condition of the adjacent abdominal organs, and especially the direction in which pressure is exerted by the mass of intestines. The position of the uterus as regards prolapse and descent depends entirely upon the strength and tone of the fascias which comprise the broad ligaments, and also those fascias which form the uterosacral ligaments and the fascias of the pelvic floor.

In a perfectly normal, healthy woman, as the size of the uterus increases in pregnancy so does the strength and elasticity of the broad ligaments, and they share with the uterus in the process of involution. If these ligaments are torn in childbirth, or if they are excessively stretched, or if they become relaxed and lose their normal strength and tone, the uterus will assume an unnatural position and the weight of the intestines coming upon the uterus will force it down; and if this force be exerted on the anterior wall, retroversion will result.

While laceration injures the supports of the uterus it is often accompanied by infection, and the result of both combined is seen in cases in which the uterus is retroverted and prolapsed, larger than the normal, through subinvolution, and often fixed more or less firmly in an unnatural position. Such a state of affairs seriously affects the patient's general health, interferes with the action of the bowels, and anemia and often toxemia result. Backache, pain, disturbance of the function of the bladder and bowels, abnormal secretions from the cervix, neuralgia, and neurotic conditions gradually develop.

To prevent so miserable a condition can nothing be done during pregnancy? The phrase "hygiene of pregnancy" covers the effort which should be made to bring the pregnant woman to labor in the best possible physical condition. In a case of slightly contracted pelvis in which there was reason to believe that the child was well developed but slightly too large for the mother, it might be the part of prudence to terminate pregnancy by the induction of labor and thus avoid injury which would be inevitable at full term.

No labor should be conducted without remembering that the successful conduct of labor calls not only for the birth of a living child but for the complete recovery of the mother, not only to life but to health. Accordingly labor must be so managed that injury shall be reduced to a minimum and shock and hemorrhage and infection prevented. This includes the wide field of skilful obstetric practice and the aids which can be obtained in a good maternity hospital where competent help is available.

There can be no question of the importance of the prompt closure of lacerations, both of the cervix, anterior and posterior segments of the pelvic floor, and perineum. Two mistakes are frequently made in carrying out this procedure. One consists in failing to close the highest point on the posterior vaginal wall of the laceration, thus failing to bring together torn portions of the fascia and uterosacral ligaments. As a result of this the cervix sags forward, which inclines the fundus to go backward. A second error consists in so applying sutures that the posterior vaginal wall is considerably shortened. This brings downward and forward that segment of the pelvic floor which should go upward and backward, and tends to throw the fundus of the uterus behind instead of in front. As in all surgical procedures the condition of the patient determines the time at which the operation should be done. With a patient in good condition immediate closure is indicated and is very successful. Where there is shock or other complication sufficient delay

may be practiced to allow the patient's condition to improve. By the term "prompt closure" of lacerations we mean primary closure, so that a primary union may be obtained. No method of dealing with this question is thorough and satisfactory which does not include the cervix, both segments of the pelvic floor, and the perineum.

Next in importance to the closure of lacerations is the securing of a condition of good involution. Absence of infection and the skilful closure of lacerations make the essential beginning, but to this must be added the influence of lactation or its absence, and the return to a condition of good general nutrition. Unquestionably successful lactation is of the greatest assistance in securing involution, but so many patients are unable to nurse a child at present that this important aid can rarely be obtained. In the absence of lactation care must be taken to secure proper elimination, to correct a tendency to anemia, and to secure a proper return of the general muscular system if possible by massage. If massage cannot be obtained, then graduated general exercises should be substituted.

So soon as the lochial discharge practically ceases a vaginal examination should be made to determine the condition of the generative tract and the presence or absence of a tendency to retroversion. In the great majority of cases women recovering from childbirth will do well to take the knee-chest posture for ten minutes night and morning. Even if retroversion be absent the uterus is often lower in the pelvis than it should be, and there is a tendency to congestion, which is relieved by the knee-chest posture, permitting the uterus to rise in the abdomen. When the physician makes his examination the patient should be upon the back at the edge of a bed or table; if a tendency to retroversion is present she should then be put in the knee-chest posture and the uterus replaced. This is best done by drawing backward and upward the posterior vaginal wall, when air enters freely and the uterus will usually go into position. If it should not do so, gentle pressure upon the fundus is usually sufficient.

The next question of importance in the convalescence of the puerperal woman is the time and the manner of leaving her bed. The profession has seen within recent years an epidemic of early getting up after labor and after abdominal operations. It cannot be said that the results have been so encouraging that we are led to abandon the older custom of having the parturient woman remain in bed for practically two weeks after confinement. With the knee-chest posture and attention given to her general condition we believe that this is still the best course with these patients. When the patient sits up care must be taken that she does this in such a manner that the whole body is adequately supported and that the trunk of the body is not bent sharply forward upon the thighs. Sitting up in bed is often a very uncomfortable and unsatisfactory performance. The body is not properly supported, the patient tends to slip down in bed, and is often fatigued instead of invigorated. Unquestionably in some cases thrombosis develops after the patient assumes the sitting posture if she bends the trunk of the body sharply on the thighs. When the patient sits up she should recline in a chair sufficiently large to support the entire body comfortably and with a good foot-rest or support for the feet. She should be careful not to bring up the trunk of the body into a right or acute angle with the thighs. The use of a commode to secure a bowel movement is a procedure which may follow soon after the first sitting up, and then the patient may gradually stand and walk. The rule that the patient may leave her bed when the lochia has ceased and when the fundus is in the pelvic brim or just above it is a good practical rule.

There is probably no method of treatment so efficient in securing good recovery from childbirth as skilfully given massage. At first this should be general, taking in the muscles of the limbs and back and chest;

the abdomen below the umbilicus should be very lightly massaged. After a few days the course of the large intestine should be mapped out, and the bowel should be manipulated on the right side upward, across, and down upon the left. Light massage should also be given over the uterus. The result of this is often to cause a return of the lochial discharge in slight degree. If other conditions are good this is no disadvantage and should not lead to the abandoning of the treatment. Massage may be continued to advantage for a month or six weeks after confinement.

So soon as the patient is up and about the question of clothing becomes a matter of medical importance. Here again the use of the corset may be a help or may injure. This will depend much upon the degree of involution already present and upon the method of adjusting the corset. It were better if the corset were not worn, and if a suitable waist were used, but it is rarely possible to secure such a result.

The best exercise for a patient recovering from confinement is walking, and that most apt to produce dislocation of the uterus is taking very high steps or lifting or straining. These should be avoided. Driving and motoring are useful to obtain air, and under comfortable conditions do no harm.

A natural suggestion in cases of partial or threatened retroversion would be that the uterus be supported by a pessary, but the efficiency of a pessary depends upon the firmness of the pelvic floor and vagina, and if these portions of the birth canal have not undergone proper involution the pessary will produce injury and not benefit. The pressure of a pessary may light up a latent infection, and a pessary should never be worn where there is a suspicion of infection or inflammation. For these reasons pessaries are rarely useful immediately after childbirth, but in from four to eight weeks a retroversion pessary with soft posterior bar may be useful for a short time. The ring pessary may sometimes be used to advantage.

The majority of obstetricians find the permanent cure of retroversion without operation unsatisfactory. A woman who has had a congenital retroversion is very apt to have this recur after she recovers from childbirth. While before her marriage this condition was of no practical importance, after marriage it becomes a serious factor. It is an interesting fact, for which there may seem to be no adequate explanation, that many of these patients have a chronic catarrh of the appendix and that some of them have chronic salpingitis as well. If such a patient has had conservative treatment to permanently replace the uterus and this treatment has failed, when she has made a good recovery from childbirth, operation is indicated. In the writer's experience intra-abdominal shortening of the round ligaments and the removal of the appendix furnish a most useful and satisfactory method of treatment. Conditions of the tubes and ovaries found at such operations must be dealt with as circumstances indicate. In the writer's experience the cure has been permanent after subsequent pregnancy and labor, and so far in his experience no case treated by operation has subsequently had a return of the retroversion. The choice of the exact method to be used in operating may be left to the judgment of the individual operator, with the caution that shortening of the round ligaments, and not ventrofixation, should be employed.

Retroversion of the uterus is one of the most common ills to which the parturient woman is exposed. It can, however, frequently be prevented and very often remedied by treatment which is not painful nor dangerous, but it is important as regards the health of the patient and should never be neglected.

DIRECT GASTRIC THERAPY.

BY MARTIN E. REHFUSS, M.D.,

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Local treatment directly applied to a diseased mucous membrane represents the ideal therapy wherever it is possible. Certain organs however, owing to their comparative inaccessibility, have not received the benefit of such measures, and in this category might be placed the stomach and upper intestinal tract. This was true as long as the old tube was used, but with the introduction of the fractional tube we have fulfilled all the conditions for directly treating the stomach with a minimum of discomfort and a maximum amount of precision. The similarity of conditions, inflammations, infections, and other pathological changes to those of other accessible mucous membranes is becoming daily more apparent, and with it is coming a better understanding regarding the care imposed by its presence. Ever since I first described the fractional examination of the stomach, I have been impressed by the possibilities not merely for diagnosis but for direct local treatment of the stomach. In various communications I have pointed out that it is possible to follow every change in gastric digestion by means of the fractional tube, and furthermore to introduce into the stomach and observe the effect of a number of substances by this method. Not only is it possible to watch the evolution of gastric digestion, but by appropriate technique, to demonstrate the actual infection of the gastric wall as well as the evidence of regurgitant infected material from the duodenum and pancreas. It is furthermore possible to completely evacuate all the material from the stomach and to apply to the mucous membrane a solution of any desired concentration, permitting the material to remain as long as desired in the stomach, and then either allowing the material to be evacuated into the bowel, or to destroy its efficiency either by aspiration or the injection of some physiological antagonist.

While we realize that many of the gastric conditions are secondary to disease elsewhere in the system, it is essential that we bear in mind the fact that in many instances there is a disease of the mucosa either through direct infection or irritation or through secondary toxic elimination. In either of these cases we have several conditions which in themselves call for direct treatment of the mucosa regardless of any particular etiology. Mucus in excess of normal when clearly gastric and not swallowed is always an indication for local treatment, and a microscopical examination of the mucus removed gives some clue as to the type of treatment to be carried out. In the first place there is a clear glassy form of mucus analogous to the mucus seen in mucomembranous colitis and characteristic of catarrhal gastritis, in which microscopical examination fails to reveal any evidence of inflammatory reaction. In other words, leucocytes are very scarce, and the mucus is rather the reaction to an irritant or possibly simply a myxorrhea such as is seen in certain cases of myorrhea gastrica, and the presumption is that there is no infection present. This type of condition calls for lavage with various alkalies, followed by astringent applications—lavage, for instance, of a weak solution of bicarbonate of soda, or a dilute solution of the substances similar to the liquor antisepticus alkalinus, followed by the instillation of permanganate of potash 1:4000 introduced through the fractional tube in doses of 2 to 3 ounces and then reaspirated. There is no necessity to recur to the use of stronger astringents inasmuch as the catarrh is frequently an expression of a cause outside of the stomach or even an evidence of vicarious elimination on the part of the stomach. The removal of the residuum on each occasion will enable the physician to determine the success of his treatment. When the mucus is thick and tenacious, I have often noted that lavage through the old large stomach

tube is absolutely inefficacious, and only recourse to positive aspiration will succeed in removal of the material.

If, however, examination shows that there are many leucocytes scattered throughout the gastric mucus and these leucocytes are for the most part polymorphonuclears, then the inference, particularly if numbers of bacteria are seen intimately mixed with the gastric contents of mucus and not discretely seen in threads, is that there is an infection in the stomach in which the treatment must be that of the following condition.

A curious misconception has arisen regarding diseases of the stomach in which the presence of pus is considered an exceedingly infrequent phenomenon. I have known many clinicians who denied the presence of pus except in the rare condition known as phlegmonous gastritis. This disease is rare and usually fatal, and the vomitus which occurs contains almost pure pus. Such a case I have seen, but it is by no means the only condition in which pus is found in the stomach. Apart from the multitude of extragastric conditions, sinusitis, pyorrhea, tuberculosis, bronchitis, bronchiectasis in which swallowed pus is found in the stomach—pus is frequently encountered in intragastric conditions, principally in the secondarily infected gastritis accompanying carcinoma, in the various infected gastritis cases with active bacterial invasion of the mucosa recognizable by means of fractional study, in the curious condition in which both blood and pus are often seen in the stomach, achlorhydria, hemorrhagic gastritis, and not infrequently in the subacid and antacid stomachs seen in various blood dyscrasias, severe anemias, and purpuras in which careful study will reveal evidences of active mucosal infection (in some cases the only evidence of infection in the system). In all the above cases, apart from any specific therapy which might be indicated, whether by vaccines, sensitized bacterins, etc., the immediate indication so far as the stomach is concerned is thorough cleansing and active disinfection. This is carried out as follows:

1. The fractional tube is passed into the stomach the first thing in the morning, and the complete residuum evacuated by placing the patient in different positions and aspirating as completely as possible.

2. This is followed by cleansing of the mucosa by lavage with alkaline solutions, preferably sodium bicarbonate 1:1000 or even 1:500, liquor antisepticus or alkalol in solutions as strong as 1:6 or 1:10, the method being to inject about an ounce and aspirate, repeating the injections until the lavage water is perfectly clear.

3. I always follow the above lavage by hot water before applying the active disinfectant.

4. After the stomach is clear and while the patient is in the recumbent posture, I introduce through the tube a measured quantity of some active disinfectant and allow it to act over a definite period of time, after which I allow it either to pass into the duodenum, or dilute it with water, or introduce neutralizing substances, or finally a measure which I often employ is to aspirate as much of the material as possible.

In this way it is possible to introduce substances in a concentration or strength which would be impossible by mouth, and also to definitely control everything that is taking place. I should say the most energetic and active disinfectant which certainly acts as an alterative to the mucosa is nitrate of silver. In this way it is possible to introduce 1/2 grain or more of nitrate of silver and permit it to remain five or ten minutes in the stomach and then withdraw the entire amount. By such a procedure it is possible to accurately control and localize the action of silver, use it in much stronger concentrations, and determine its action over the entire gastric mucous membrane without obtaining any injurious systemic effect. In only two instances of the many hundreds of silver applications I have made has there been any subsequent discomfort, and in both these cases the patients complained of upper abdominal cramps. In both instances the discomfort passed off after a time without any further trouble. The silver introduced can be allowed to remain or diluted

further by the introduction of water or neutralized and converted into the chloride by the simple injection of salt solution. The method which I regularly employ in all cases in which I find muco-pus in the stomach is to introduce the silver nitrate in a small volume, not over one ounce of solution, and after five to ten minutes aspirate as much as possible. The amount remaining will give no trouble. Ordinarily the material aspirated has already been largely converted into the chloride by the chlorides either in the stomach or secreted by it. Another preparation which is very well borne in the stomach is the colloidal suspension of iodide of silver, which can be used in the same way as the nitrate; it is well borne, unirritating, and has a pronounced effect for good in these cases. The use of the organic silver preparations—argyrol, protargol, etc.—can be carried out in the same way, although in my hands they have not been as effective as the other preparations. The character of the residuum together with microscopical examination of the latter will be the guide to the success of the treatment.

Hydrogen peroxide has been used in these conditions, but in my hands it has not been so satisfactory. In the first place it occasionally induces nausea, and often irritates the mucosa. In an old gastritis with tenacious mucus it might be advantageously used after alkaline lavage. As an active disinfectant in dilution of 1:5 or 6, which is about the highest concentration in which it should be used in the stomach, I am rather skeptical as to its value. The same thing can be said regarding iodine. In my earlier work I used the tincture diluted, but the tincture is not well borne except in great dilution, and the results with silver are so very much better that the iodine preparations need not be used.

One point must be borne in mind regarding the introduction of substances into the stomach, and that is the fact that practically all substances in solution are followed by an active secretion (except in those cases in which from some pathological process the secretion is lacking). This alters the action of the substance to a certain extent.

Probably one of the most interesting problems in gastric therapy is the question of the administration of hydrochloric acid. So much has been written regarding the action of hydrochloric acid that considerable confusion exists regarding the exact action of this substance in the stomach. In the perfectly healthy stomach, if a quantity of hydrochloric acid is introduced into the stomach of an acid grade higher than that of the gastric juice, it is rather rapidly neutralized and brought down to a level with the other gastric secretion. This neutralization is brought about by a positive regurgitant mechanism in which the pancreatic juice is regurgitated from the duodenum into the stomach. To a less degree dilution with a "verdunnungs fluid" from the gastric wall may account for it. In stomachs of this type of normal or high acid figures the effect of small doses of hydrochloric acid is lost so far as the chemistry of the stomach is concerned, and the injections of acids of a higher acid grade than that of the stomach are rapidly brought down to or below the gastric optimum. In the antacid and subacid stomach the effect is different, and the reaction is entirely dependent on the pathological factors which may be present. It has been pointed out, for instance, that in gastric achylia the administration of even such small doses as 15 drops of the dilute hydrochloric acid will often control the diarrhea of achylia. A study of these cases, however, will reveal from the standpoint of the gastric curve almost no change in the chemistry of the stomach; in fact it is impossible to determine any effect on the secretory curve by the administration of the small therapeutic doses of the dilute acid. I was rather interested in this problem, and recently in just such a case I attempted to convert an achylia curve into a normal curve by the following procedure: I introduced a modified double tube into the stomach, one tube of which was connected up with a Murphy drip apparatus, the other arranged so that its tip was about four inches from the first

tube. By means of the second tube it was possible to study the effect of the drip introduced through the first tube. The patient was given an Ewald meal (patient emptied an Ewald meal in two hours) and the drip started with 0.25 per cent HCl. This was continued over two hours, 250 Cc. of the solution being given during the first hour and 150 Cc. during the second hour. By means of the second tube specimens were obtained at intervals and the curve recorded. In spite of the high acidity of the liquid introduced and the rapid rate of flow the acidity at the end of the first hour registered only 0.12 total acid, and only after the extreme end of the second hour did it approach anywhere near the figures of the solution introduced. It can be thus appreciated that if the ideal result would be a duplication of the normal curve very large quantities of acid would be necessary, and very often in these cases even moderate quantities are poorly borne by the patient. There seems to be a form of gastric hyperesthesia toward acid, or rather an acid intolerance.

The administration of acid in small doses, however, in selected cases does have a pronounced effect for good not merely by its stimulatory effect on gastric and pancreatic digestion, but also by virtue of the disinfectant action. In these resistant cases it would be well to try what I have called "fractional administration" of the substance. With the fractional tube in place a solution of hydrochloric acid of 0.25 per cent rather than the dilute official acid is used and introduced through the tube at intervals of ten to fifteen minutes throughout digestion. Small doses just sufficient to stimulate secretion are used, although I have employed as much as half an ounce every fifteen minutes throughout the entire digestive period. After the mucus and evidences of catarrh are cleansed from the stomach in these subacid cases, a few treatments following the above directions often have a surprising effect on digestion and appetite. In a certain small percentage of cases such treatment is not well borne, but in all resistant cases of this kind it is worthy of trial.

One of the most interesting results of this kind was that of Dr. Daniels of Savannah, Georgia, who remarked the almost constant association of achylia with pellagra in the South, and several of my colleagues in that part of the country have reported the same statistics. Dr. Daniels in a personal communication reported the excellent results obtained by the fractional administration of hydrochloric acid. Treatment directed toward the stomach in that way resulted in general amelioration of all symptoms of the malady.

Another chapter of gastric therapy worthy of study and direct treatment is the question of secretory disturbances. The question of hypersecretion and hyperacidity as controlled by direct gastric treatment is one which future research will clear up. The varying etiology suggests naturally a varying therapy, but in those types which are associated with mucosal disturbances local therapy is indicated.

The question of the neutralization of the secretion in the treatment of ulcer as suggested by Sippy has been productive of great good and unquestioned results in the treatment of ulcer. This is no place for the discussion of the rôle of HCl in ulcer causation or the real explanation of ulcer chronicity; suffice it to say that according to Sippy the ideal neutralization is accomplished by the alternate feeding and saturation plan. This works out very well in some cases; in others it is decidedly inaccurate, and we must determine by direct titration the amount of alkali necessary to saturate the secretory output. This can best be done by leaving the fractional tube *in situ* in the stomach during several feeding and neutralization periods, removing fractional specimens and determining the degree and the duration of neutralization. In this way we can establish precisely the amount of alkali necessary. In our laboratories we have examined a small series of cases in this way, and in a certain proportion there is a discrepancy, which is prevented by increased alkalinization. Some of our studies have emphasized the importance of the introduction of various sub-

stances in secretory conditions. For instance, in the laboratories of Physiological Chemistry at Jefferson Medical College we showed that the injections of concentrated solutions of salt and dextrose were capable of delaying the appearance of the secretion or the acidity over long periods. This probably forms the basis of the Loeper sugar cure of ulcer. Many points the significance of which are not clear have been established, but it is to be hoped that the future will enable us to treat true gastric disturbances much as we treat mucous membranes elsewhere, directly.

THE TREATMENT OF BURNS BY THE APPLICATION OF PARAFFIN.

BY GEORGE IRVING WALTERS, PH.D., M.D.

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Protective substances in the treatment of burned or severely irritated tissue areas have been recognized as an important therapeutic means of handling a most discouraging surgical condition for many years, and the wide diversity of end results has tended to keep the subject before surgical research bodies in some degree much of the time.

Oils, chemicals and emollients, plastic applications, thermic air baths, under-water treatments, and wax, have all been experimentally tried, adopted for a moment, so to speak, and as quickly laid aside because of the unsatisfactory and inconsistent results obtained.

Recent literature is replete with information concerning the treatment of burns with paraffin preparations. While many good results are to be found among cases which have been treated by almost any of the above mentioned methods, none have shown the consistently satisfactory results which paraffin application has produced, though even in this treatment the final effect varies with certain factors which it is the intent of this paper to show.

The action of most of these substances is based upon the purely mechanical properties of the paraffin base (Hull). It would seem, therefore, that if such is the case and the results heretofore obtained are really as good as reports credit them with being, a substance having certain active therapeutic properties would be even more brilliantly successful. Experiments hereinafter quoted show this to be true. Of the work already accomplished by paraffin substances little need here be said, since it is the subject of innumerable reports in other periodicals. The conclusions already drawn from these experiments show that the action of the better known paraffin preparations is as follows:

1. Mechanical, consisting of (*a*) splint-like control of local nervous reactions; (*b*) protection of wound from air and external influences.

2. Apparently therapeutic: (*a*) Encouragement of new granulations; (*b*) analgesic; (*c*) cicatrization greatly eliminated; (*d*) grafting of skin often unnecessary.

Beiter attempts to prove by certain experiments with paraffin immersed in water that the ingredients held in the paraffin base are released only in infinitesimal amount, and after two and a half hours fail to show any accumulation in the liquid. However, specimens immersed in serums and saline solutions tend to show that while the amount released from the paraffin is comparatively low, there is sufficient to promote therapeutic reactions which are very desirable and a distinct advantage in the product.

These experiments follow:

Experiment No. 1.

A paraffin mixture "G" *infra,* containing salicylic acid, was immersed in normal horse serum and let stand at room temperature for two hours. At the end of fifteen minutes a strong ferric chloride test reaction was obtained which steadily increased during the two hours, although the container

was undisturbed and no effort at shaking down the substance was made. It was then incubated at 37° C. for twenty-four hours, and occasional observations proved that considerable salicylic acid was released at each reading. The paraffin when removed to another vessel at the end of twenty-four hours still released some acid, but the action of the fluids upon the paraffin was not thoroughly tested. The external surface of the paraffin appeared somewhat granular.

Experiment No. 2.

Paraffin mixture "E," to which methylene blue was added, was immersed in serum as before, and placed at room temperature for two hours. At the end of one hour the serum was a distinct blue, which increased proportionately during the succeeding hour, when the container was placed in the incubator at 37° C. This experiment showed conclusively that the paraffin continued to release the blue for several hours, and that the material released was sufficient to have some medicinal effect was illustrated by the following experiment.

Experiment No. 3.

Saline solution to which methylene blue had been added by immersion of preparation used in Experiment 2 was added, and was injected subcutaneously in a dog weighing 8 kilogrammes. At the end of three hours a distinct blue was noted in the urine. The experiment was also tried by laying a piece of paraffin in the subcutaneous tissue and closing the wound with sutures. Staining of the adjacent tissues was also sufficient to demonstrate histological structure. The appearance of the paraffin showed whitened granular surfaces and a somewhat deeper exudative process than might be expected. It is evident that the area of the exposed surface is, however, a very potent factor. The local absorption, however, is sufficient for desirable therapeutic action, is the belief of the writer.

Following the requirements which a study of wounds suggests (Fauntleroy, Arthur), a preparation known as Paraffin "E" in this study was formulated and given extensive therapeutic trials in various emergency clinics as well as upon laboratory animals. The results were most gratifying. Under certain conditions paraffin preparations may be of doubtful value. Like all medical and surgical values it is capable of many contradictory results, and care in technique with intelligent observation has much to do with the results. The scientific preparation of the substance to be applied in the treatment is primarily essential.

The main considerations in the preparation of a substance of this character are as follows:

1. Aseptic cleansing of wound.
2. Drying and protection.
3. Flexibility of dressing.
4. Cohesion.
5. Adhesion.

If paraffin preparations are applied in an even, thin layer, forming a complete covering of the wound, the result will be as surely compatible with the requirements 3, 4, and 5 as though a heavy layer had been added. In fact, it is obvious that a number of layers applied, one superimposed upon the other, only tends to stiffen the dressing, much as though a portion of the cake had been laid directly upon it without proper heating. The result would be only failure in some of the most desirable features of the treatment.

The value of paraffin as a dressing has only recently received its merited attention, and a study of cases in which it has been tried reveals several well-established *cures* which assume to a remarkable degree the appearance of fiction-like exaggerations. It is due to this that some highly colored and very impossible reports have been given wide-spread advertising and undesirable credence by those ignorant of the real conditions involved in surgical therapeutics. It should be remembered that a natural course of normal tissue repair must be brought about by encouraging growth metabolism under desirable and protective influences. This is the action of the various paraffins in greater or less degree, and these preparations have been tested severely for their mechanical and therapeutic values.

The formulæ tried in these experiments are briefly summarized in the following list, which covers fairly well the principal paraffins now to be found in certain well-known clinics:

Paraffin "A."

Resorcin, 1 per cent.
Eucalyptus oil, 2 per cent.
Olive oil, 5 per cent.
Paraffin molle, 25 per cent.
Paraffin durum, 67 per cent.

Paraffin "B."

Paraffin (51° C.), 70 grammes.
Liquid petrolatum, U. S. P., 3.0 Cc.
White beeswax, 10.0 grammes.
Resin, 7.0 grammes.
Resorcin, 0.2 gramme.
Sudan III, 0.05 gramme.
Alcohol, 10.0 Cc.

Paraffin "C."

Paraffin.
Resins.

Not analyzed, but found to be quite unstable in its constituency, the ingredients separating out upon heating, leaving the pure wax practically unadulterated by any substance whatever.

Paraffin "D."

Paraffin, 94-96 per cent.
Gum elemi, 0.20-25 per cent.
Japan wax, 0.40-50 per cent.
Asphalt, 0.20-25 per cent.
Eucalyptol, 2.0 per cent.

Color with 0.5 to 1.0 per cent solution alkannin in eucalyptol and minute quantity gentian violet.

Paraffin "E."

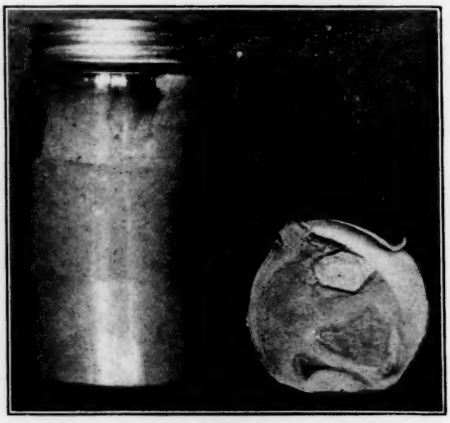
Paraffin durum, about 75 parts.
Paraffin molle, 25 parts.
Olive oil, 5 per cent.
High phenol coefficient oil; proportion (1:200).
Chloretone, about 10 per cent.
Colored with Scharlach R in alcohol.

Paraffin "F."—Same as "E," with solid extractives added.

Paraffin "G."—Same as "F," with salicylic acid, about 3 per cent.

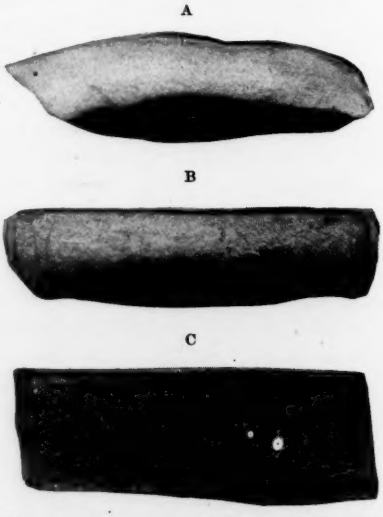
The greatest objections to paraffins A, B, C, and D seem to lie in the fact that they contain incompatible substances which precipitate as soon as the paraffin bases are melted so that they are freed. Preparations E and F were stable and homogeneous throughout all experimental trials. The case reports here given suggest proof of their varying values as therapeutic and surgical appliances.

Case 1.—Male, thirty-one years of age. Accidental amputation of four fingers of



Showing paraffin "F" after cooling in glass jar. The mass is perfectly homogeneous. No precipitation.

right hand at phalangometacarpal articulations. Bones clean and protruding. Surrounding tissues receding, slightly lacerated. In order to make a flap it would have been



Sections showing comparison between perfectly suspended ingredients and precipitated ingredients in melted paraffins allowed to cool without stirring. "A" = paraffin B; "B" = paraffin D; "C" = paraffin E, without coloring matter.

necessary to amputate a portion of each metacarpal, destroying the otherwise complete palm. At the suggestion of the surgeon in charge the hand was dressed with

paraffin "A" daily. No infection developed, and normal granulation with skin growth from edges of the wound showed complete healing with no noticeable scar in about four weeks.

It will be noted that skin-grafting was unnecessary, although a considerable portion of skin tissue was absolutely destroyed. Also no keloid developed.

Case 2.—Male, aged thirty-two. Indolent ulcer, about 5 or 6 square inches, following compound comminuted fracture of the tibia.

This case had resisted all treatment until a dressing of paraffin medicated with salicylic acid and hemostatic serum precipitates (Paraffin "G") was applied. The wound

In the treatment of burns several statements recently made concerning the efficacy of paraffin preparations as being due solely to mechanical causes led the author to investigate this phase of the matter.

Samples of various formulæ were made up in the laboratory and stock market products were procured. The results are instructive and highly interesting. In this I had the coöperation of Dr. H. N. Torrey, Dr. Stilwell, and Dr. Dibble, of Detroit.

It will be seen from this table that in every instance the paraffin containing a high phenol coefficient tended to exhibit a constant superiority in germicidal action, and in the case of preparation "F" containing a

TABLE SHOWING CASE RESULTS SECURED WITH THE VARIOUS PARAFFIN PREPARATION FORMULÆ GIVEN ABOVE.

Case.	When Seen.	Treatment.	Result.
Second degree burn on leg about 12 sq. in. circular margin.	Upon admission.	½ area with "A." ½ area with "E."	"A" healed in 24 days. "E" healed in 21 days, no cicatrix.
Second degree burn from gasoline. About 40 sq. in., 2½ in. average width.	Third day. Necrotic slough profuse.	½ area with "C." ½ area with "F."	"C" showed clean strong granulations on 8th day, healed 32d day. "F" showed clean granulations 5th day, healed on 28th day.
Third degree lesion from corrosive poison injected by accident. Circular depressed wound about ⅜ inch deep and 2 inches diameter.	On admission. Tissues non-purulent. Dead tissues sloughing.	Paraffin "F."	Daily dressings cleaned wound in 14 days. Healthy granulations and complete healing in 37 days.
Second degree burn, 6 inches wide; oval, 8 inches long.	Seventh day. Tissues infected slightly; suppuration established.	½ paraffin "B." ½ paraffin "E."	"B" cleaned up in 5 days, healed 17 days later. "E" cleaned up in 4 days, healed 16 days later.
Second degree burn, about 26 sq. in.	Second day.	½ area with "D." ½ area with "E."	"D" granulations clean and healthy 7th day, healed 29th day. "E" granulations clean and healthy 7th day, healed 27th day.

cleaned up with fresh granulations in ten days, and one month from the date of initial application the ulcer had completely healed. This serum-paraffin was suggested by the marked action of serum upon similar ulcers as tried previously in hemostatic experiments.

Case 3.—Male, aged forty-four. Burn of second degree involving inner aspect of thighs and about pubic region from gasoline explosion.

This case was dressed with paraffin "F" daily, and discharged cured in three weeks. The skin developed from islets as expected, and scar tissue did not appear.

certain suspension of serum derivatives the progress of the wound repair was markedly more rapid than with the other preparations.

It has been demonstrated above that the release of salicylic acid from properly balanced paraffin bases is brought about in sufficient quantities to have a very desirable inhibitive effect upon bacterial growth.

This is also seen by transplants from cultures incubated upon serum paraffin bases for twenty-four hours to which germicides were added.

It was mentioned above that many of the paraffin preparations are not made up with soluble materials, the ingredients settling

out upon heating the paraffin base. This is not the case with preparations "E," "F," and "G," which remain a homogeneous mass when heated in the hot-water bath to the melting point. It was seen, however, that when melted over a flame the hot dish had a tendency to not only crystallize the paraffin but coagulate certain ingredients and create a precipitation. It appears to the writer that if the material is used in the proper manner it will prove to be much superior to most of the substances now at the command of the surgeon, and many of the very plausible objections being offered will be found to be of very slight effect.

Of the method of application now in vogue nothing need be said except that in the experience of the writer and his associates cotton has been discarded and sterile gauze in a single thickness used between the first and second layers of the paraffin to give it "body." This does not stiffen so readily as cotton, and being more permeable gives a clean, even, and homogeneous mass to the dressing, which is not only easy to apply and remove, but very neat and attractive as well.

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PITUITRIN IN TONSILLAR AND NASAL HEMORRHAGE.

BY SAMUEL SALINGER, M.D.,

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The subject of tonsillar and nasal hemorrhage is a particularly engrossing one because of the large number of operations being performed and because of the fact that such hemorrhages cannot be prognosticated in a given case. Any agent, therefore, that will, even in a small measure, tend to diminish the danger of such hemorrhage is indeed a welcome addition to the surgeon's armamentarium and should be thoroughly investigated. My experience with pituitrin is herewith summarized in a series of 100 cases in which it was employed as a hemostatic agent. In 87 it was given fifteen minutes prior to operation as a prophylactic, and in the remainder it was used for the control of secondary hemorrhage. The dose was ½ Cc. for children and a full Cc. for adults.

Inasmuch as the amount of hemorrhage in any given case cannot be accurately determined as to quantity, we must necessarily be empirical in our judgment of it, and the description of the bleeding will depend upon an arbitrary classification which will vary with the individual operator.

In my own cases I have been in the habit of speaking of hemorrhage as being "slight," "moderate," or "severe." By a slight hemorrhage I mean an oozing which follows immediately after removal of the tonsil (or other structure operated) and ceases spontaneously within a few seconds without any local hemostatic measures being employed. A moderate hemorrhage is one where the oozing may be venous in character and lasts several minutes, requiring sponge pressure for its control. A severe hemorrhage is usually venous or arterial in character, persists despite sponging, and requires a tonsil clamp or ligature.

In the table below are summarized 87 tonsillectomies where pituitrin had been administered as a prophylactic prior to the operation, 35 of which were done under local and 52 under general anesthesia. Among the local cases the bleeding was slight in 29, moderate in four, and severe in

one. There were five cases of after-bleeding. The severe hemorrhage occurred in a man of twenty-nine whose tonsils were enormously hypertrophied. The anesthetic used was cocaine flake and adrenalin topically, followed by the injection of novocaine 1 per cent. The tonsils were easily removed by dissection and snare. The wire, however, broke off on one tonsil, and being embedded in the tissue could not be removed. I therefore severed the tonsil from its base with a Freer tonsil knife curved on the flat. This was followed by a profuse venous hemorrhage emanating from the lower pole of the tonsillar fossa which was uncontrollable by pressure or local styptic measures. He was given 1 Cc. of pituitrin and 1/6 grain of morphine; the hemorrhage gradually subsided and a large clot filled the fossa. Ice-bags were applied to the throat and calcium lactate given internally. In the next few days there was occasional slight oozing and the clot gradually disappeared. On the sixth day following the operation a violent hemorrhage occurred from the same side; 1 Cc. of pituitrin was given, and he was taken to the hospital, put under gas and a tonsil clamp applied, which was left *in situ* for six hours; upon removal there was no further hemorrhage. He was kept under observation at the hospital for a week until the wound had healed.

In addition to this case there were four other cases of secondary hemorrhage. In one (case 6) there was a slight oozing several hours after the operation and the formation of a clot. The clot was removed and Monsel's solution applied, and a hypodermic injection of pituitrin 1 Cc. given. The oozing ceased promptly and did not recur.

In case No. 9 a hematoma formed in the soft palate due to the injection needle striking an anomalous vein. This did not give rise to any trouble during the operation, but the following day a large clot formed in the fossa extending up into the soft palate (the tonsil had been large and deeply buried) and there was a persistent slight oozing. One Cc. of pituitrin was given and the clot left undisturbed. No other hemorrhage occurred, and the clot disappeared within twenty-four hours.

In case No. 52 there was a severe hemorrhage on the sixth day following the operation, coincident with the appearance of the menses. The bleeding lasted several hours and ceased spontaneously. This hemorrhage could probably have been avoided had the operation been postponed to the intermenstrual period.

In case No. 82 there was a slight oozing about four hours after the operation, which failed to yield to cold applications. After a hypodermic injection of 1 Cc. of pituitrin the hemorrhage ceased and did not recur.

In case No. 85 I removed a very large adenoid and a pair of buried tonsils from a young man of twenty. On the sixth day there was an oozing from the nose and throat that persisted for several hours with increasing volume. One Cc. of pituitrin was administered, and the hemorrhage ceased within ten minutes. There was no recurrence.

Among the 52 cases done under general anesthesia the bleeding was slight in 33, moderate in 16, and severe in one. The last mentioned occurred in a child of eight who was very anemic and poorly nourished. The hemorrhage came from a vein situated deeply in the right tonsillar fossa which defied all efforts at suturing. A tonsil clamp was applied and left *in situ* for two hours, after which there was no further bleeding.

From a review of these cases it is apparent that pituitrin is not a sure preventive of hemorrhage, for there were two cases of severe bleeding out of the 87 cited in which the pituitrin apparently exerted no prophylaxis. However, I am convinced that this drug has a marked hemostatic influence from the fact that 62 out of the 87 cases showed only a slight bleeding at the operation—*i.e.*, an oozing immediately following the removal of the tonsil which ceased spontaneously within a few seconds and required no pressure or other hemostasis. This is far better than the results I have seen in cases in which pituitrin was not

used. The bleeding following a tonsillectomy is usually profuse, particularly under general anesthesia, and in most cases requires pressure for several minutes to bring it under control.

In this respect, therefore, the use of pituitrin as a prophylactic is a distinct advantage.

As for secondary hemorrhage, the five cases cited above all followed local anesthesia, and I do not think they can be attributed to any after-effect of the pituitrin inasmuch as there was no such case observed following general anesthesia in which pituitrin had also been used. It is a common experience of laryngologists that secondary hemorrhages are far more likely to occur after a cocaine anesthesia because of the relaxation of the blood-vessels which follows after the constricting effect of the cocaine has worn off.

My results with pituitrin used as a hemostatic in the presence of a hemorrhage have been very gratifying. In five cases of secondary tonsillar hemorrhage cited above, pituitrin alone was sufficient to control the bleeding. Besides, I have employed this agent in six cases of secondary nasal hem-

No.	Name	Age	Operation	Anesthetic	Amount Hemorrhage	Secondary Hemorrhage	Other Complications
1	R. B.	20	Tonsils	Local	Slight	None	None.
2	W. T.	27	Tonsils	Local	Slight	None	None
3	A. S.	3	Tonsils and adenoids	General.	Slight	None	None
4	L. P.	13	Tonsils and adenoids	General.	Moderate	None	None
5	A. L.	3	Tonsils and adenoids	General.	Slight	None	None
6	J. M.	45	Tonsils	Local	Slight	Oozing 6 hrs. after	Second injection Pituitrin given
7	L. D.	21	Tonsils	Local	Slight	None	None
8	B. W.	30	Tonsils	Local	Slight	None	None
9	C. G.	40	Tonsils	Local	Slight	Oozing a few hrs. after	Hematoma
10	J. M.	33	Tonsils	Local	Slight	None	None
11	S. R.	45	Tonsils	Local	Slight	None	None
12	G. Z.	4	Tonsils and adenoids	General.	Slight	None	None
13	A. D.	32	Tonsils	Local	Slight	None	Acute artic. rheumatism
14	G. O.	3	Tonsils and adenoids	General.	Slight	None	None
15	P. A.	6	Tonsils and adenoids	General.	Slight	None	None
16	A. G.	13	Tonsils and adenoids	General.	Slight	None	None
17	Z. R.	7	Tonsils and adenoids	General.	Slight	None	None
18	S. C.	14	Tonsils and adenoids	General.	Moderate	None	None
19	L. H.	38	Tonsils	Local	Slight	None	None
20	T. Z.	5	Tonsils and adenoids	General.	Slight	None	None
21	B. M.	5	Tonsils and adenoids	General.	Slight	None	None
22	N. P.	18	Tonsils	Local	Moderate	None	None
23	R. M.	22	Tonsils	Local	Slight	None	None
24	M. Z.	5	Tonsils and adenoids	General.	Slight	None	None
25	N. C.	4	Tonsils and adenoids	General.	Slight	None	None
26	C. A.	32	Septal spur	Local	Slight	Furious after removal pack	Several secondary hem.
27	D. B.	30	Tonsils	Local	Slight	None	None
28	S. M.	43	Septal spur	Local	None	None	None
29	P. B.	50	Septal spur	Local	None	None	None
30	*L. K.	18	Inf. turb	Local	Profuse	Slight	Pituitrin (for after hem.)
31	L. K.	18	Inf. turb	Local	Slight	None	None
32	I. S.	34	Tonsils	Local	Slight	None	None
33	A. H.	35	Septal spur	Local	None	Slight	None
34	E. L.	6	Tonsils and adenoids	General.	Slight	None	None
35	J. D.	24	Tonsils	Local	Slight	None	None
36	M. F.	43	Septum	Local	None	None	None
37	J. C.	35	Tonsils	Local	Slight	None	None
38	C. S.	23	Tonsils	Local	Slight	None	None
39	B. K.	7	Tonsils and adenoids	General.	Slight	None	None
40	I. H.	28	Tonsils	Local	Slight	None	None
41	R. S.	11	Tonsils and adenoids	General.	Moderate	None	None
42	L. P.	33	Tonsils	Local	Slight	None	None
43	*M. K.	37	Inf. turb	Local	Slight	Slight on 3rd day	Pituitrin (for after hem.)
44	L. Z.	20	Tonsils	Local	Slight	None	None
45	D. F.	12	Tonsilitis and adenoids	General.	Moderate	None	Acute rhinitis 5 days later.
46	S. B.	4	Tonsils and adenoids	General.	Slight	Nasal hem. 3rd day	Pack and Pituitrin
47	F. C.	21	Tonsils	Local	Slight	None	None
48	H. B.	2	Tonsils and adenoids	General.	Moderate	None	None
49	L. S.	27	Tonsils	Local	Slight	None	None
50	P. C.	5	Tonsils and adenoids	General.	Slight	None	None
51	L. L.	28	Tonsils	Local	Slight	None	None
52	P. E.	17	Tonsils	Local	Slight	6th day (menst. period)	Ceased spontaneously
53	R. A.	28	Tonsils	Local	Slight	None	None
54	L. G.	8	Tonsils and adenoids	General.	Slight	None	None
55	W. R.	31	Tonsils	Local	Slight	None	None
56	M. L.	19	Tonsils	Local	Slight	None	None
57	S. S.	5	Tonsils and adenoids	General.	Moderate	None	None
58	*J. C.	28	Inf. turb	Local	Slight	Recurring hem	Several packs and Pituitrin
59	A. S.	9	Tonsils and adenoids	General.	Moderate	None	None
60	E. S.	5	Tonsils and adenoids	General.	Slight	None	Septic pneumon. 3rd day; recovery 3 weeks

*Indicates no prophylactic dose of Pituitrin given prior to operation.

No.	Name	Age	Operation	Anesthetic	Amount of Hemorrhage	Secondary Hemorrhage	Other Complications
61	B. F.	11	Tonsils and adenoids	General.	Slight	None	None
62	G. R.	5	Tonsils and adenoids	General.	Moderate	None	Croupy cough next day, lasting 1 hour.
63	I. M.	22	Tonsils	Local	Moderate	None	None
64	*M. Mc	41	Frontal sinus mid. turb.	Local	Moderate	Recurring hem	Pituitrin and repack
65	S. F.	19	Tonsils	Local	Slight	None	None
66	M. F.	22	Tonsils	General.	Slight	None	None
67	M. F.	24	Tonsils	Local	Slight	None	None
68	M. R.	29	Tonsils	Local	Severe	5 days after	Clamp applied
69	F. S.	28	Tonsils	General.	Moderate	None	None
70	N. R.	5	Tonsils and adenoids	General.	Slight	None	Febrile reaction
71	A. R.	18	Tonsils	General.	Moderate	None	None
72	*E. D.	24	Inf. turb	Local	Slight	4th day	Controlled by Pituitrin
73	C. A.	16	Tonsils and adenoids	General.	Slight	None	None
74	B. G.	5	Tonsils and adenoids	General.	Slight	Slight 12 hrs. after	Ceased spontaneously
75	B. M.	10	Tonsils and adenoids	General.	Spurting one side	None	None
76	C. B.	7	Tonsils and adenoids	General.	Moderate	None	None
77	A. K.	15	Tonsils and adenoids	General.	Moderate	None	None
78	I. Z.	12	Tonsils and adenoids	General.	Slight	None	None
79	F. R.	12	Tonsils and adenoids	General.	Slight	None	None
80	F. H.	53	Septum	Local	None	None	None
81	D. M.	4	Tonsils and Adenoids	General.	Slight	None	None
82	*S. L.	22	Tonsils	Local	Moderate	Persistent oozing	Pituitrin controlled
83	Y. H.	19	Inf. turb	Local	None	None	None
84	R. S.	15	Tonsils and adenoids	General.	Moderate	None	None
85	M. A.	20	Tonsils and adenoids	Local	Slight	Nasal hem 6th day	Controlled by Pituitrin
86	R. S.	21	Tonsils and adenoids	Local	Slight	None	Serous otitis media
87	E. W.	8	Tonsils and adenoids	General.	Moderate	None	None
88	*M. S.	32	Spur and inf. turb	Local	Moderate	Post-nasal 6 hrs. after	Controlled by Pituitrin
89	E. K.	19	Tonsils	General.	Moderate	None	None
90	R. J.	19	Tonsils and adenoids	General.	Moderate	None	None
91	D. K.	23	Tonsils	Local	Slight	None	None
92	L. I.	14	Tonsils and adenoids	General.	Moderate	None	None
93	A. B.	8	Tonsils and adenoids	General.	Severe; clamp appl'd	None	None
94	W. G.	12	Tonsils and adenoids	General.	Slight	None	None
95	B. P.	7	Tonsils and adenoids	General.	Slight	None	None
96	S. R.	13	Tonsils and adenoids	General.	Slight	None	None
97	M. G.	13	Tonsils and adenoids	General.	Moderate	None	None
98	A. B.	11	Tonsils and adenoids	General.	Slight	None	None
99	P. F.	32	Tonsils and adenoids	General.	Slight	None	None
100	L. F.	8	Tonsils and adenoids	General.	Slight	None	None

*Indicates no prophylactic dose of Pituitrin given prior to operation.

orrhages following operation, and in all but one the pituitrin alone brought about a cessation of the bleeding within an average of fifteen minutes after the injection. The only instance in which it failed was in case No. 26, where immediately following the removal of the pack forty-eight hours after an operation for a spur there was a furious hemorrhage which required another pack. This was removed in forty-eight hours and was again followed by a violent hemorrhage. The nose was again packed, and this time the packing was left *in situ* for five days. In the meantime pituitrin had been given twice without any effect. The hemorrhage in this case came from an artery in the base of the septum which must have been sliced in its long axis, thus making its obliteration difficult.

It has been my experience in nasal operations that the use of pituitrin as a prophylactic is unnecessary because there is rarely any primary hemorrhage in such cases, particularly when the pure cocaine flake is used as the anesthetic; and secondary hemorrhage is also uncommon if the packing is not removed until at least forty-eight hours have elapsed. In fact I have made it a practice never to remove a nasal pack until it is thoroughly loosened; using the lint strips soaked in bismuth subnitrate and oil of vaselin I have no fear of infection, and have left such a pack in the nose in several instances for five days without any untoward results.

Where a secondary hemorrhage does occur, unless it is arterial, I have found pituitrin very successful, and in most cases its use will obviate the necessity of repacking the nose.

CONCLUSIONS.

Pituitrin given as a prophylactic before tonsillectomy will in most cases diminish the amount of blood lost, particularly under general anesthesia.

When used for the control of a secondary hemorrhage, pituitrin is a successful agent, acting promptly particularly in tonsillar and turbinal hemorrhages.

25 E. Washington Street.

POLIOMYELITIS FROM THE STANDPOINT OF THE NEUROLOGIST.

BALL writes in the *Saint Paul Medical Journal* for August, 1917, on this topic. He says that in the management of the second stage of the disease organization and coöperation are especially needed, if we expect to fulfil our obligation to those who are affected. In many cases, which are apparently severely paralyzed in the beginning of this stage, with what has been termed "follow-up" procedures, really remarkable results are often obtained. The "follow-up" methods are massage, electricity, the application of heat in some form, muscle training, and the use of braces. Massage is, of course, indicated in every case, and its value is increased if preceded by a warming up of the paralyzed parts by hot applications or electric bulbs. Electricity is one of our most useful agents during this period, although there is a tendency, especially among orthopedists, to speak lightly of its value. On this point Sachs says: "Whatever opinion we may entertain as to the therapeutic value of electricity, we are all agreed as to the great value of electro-diagnosis. In every instance an electrical examination, with the faradic and galvanic currents, should be made of every group of paralyzed muscles." There is no better way of deciding as to whether a paralyzed muscle or group of muscles will recover than by determining their electrical reactions. We have in electricity, also, one of the best means of noting progress from week to week in the affected muscles, by observing the improvement in their response to electrical stimulation.

In judging of the therapeutic value of electricity, it is well to consider what it does. When applied to a paralyzed muscle it causes its contraction by a stimulation of the nerve which supplies it; in other words, the muscle is induced to function by means of electrical stimulation. In making a distinction between the action of electricity and massage, one might say massage gives the muscle passive exercise, but electricity causes the muscle to exercise itself. Under these conditions the danger of overexercise and muscular exhaustion is greater with electricity than with massage. If, however, caution is observed in regard to this, the exercise which the muscle takes itself would seem preferable to that which is given it.

The currents to use for therapeutic purposes are either the galvanic or sinusoidal. If the electricity is to be given intelligently, its application should be restricted to those who have had special experience and training with it. To turn an ignorant person loose with a box of electrical currents would be just as sensible as putting one's patient in a pharmacy, and, in the language of the street, telling him to "go to it." If this advice were followed, naturally in the majority of instances some unfavorable results might be expected.

Muscle training is another method for restoring power to the paralyzed muscles. Lovett says, in his opinion, muscle training is the most valuable measure of all during this stage. He defines it as an attempt to drive an impulse from the brain to the muscle, to enable it, if possible, to open up new paths around affected centers in the cord. Practically, it means having your patient concentrate and then endeavor to carry out a directed movement in the paralyzed part.

The proper application of braces is a very important part of the plan of treatment in this stage. It is here particularly that the closest coöperation should exist between the neurologist and the orthopedist. The knowledge of the one with reference to the electro-diagnosis and prognosis of paralyzed muscles is supplemented by the experience of the other with reference to the avoidance of muscle and ligament stretching and their resulting deformities by the application of suitable braces. Lovett says, in regard to apparatus, that a good general rule to observe is that it should be used when the patient cannot stand without it, or if standing or walking a position of deformity is assumed.

The third or chronic stage, so far as treatment is concerned, is chiefly an operative one and belongs in the main to the realm of orthopedic surgery.

EDITORIAL.

THE RELATIVE VALUE OF MERCURIALIZED SERUM AND SALVARSANIZED SERUM IN SYPHILIS OF THE CENTRAL NERVOUS SYSTEM.

At a time when it is difficult to obtain salvarsan the matter of the employment of mercury in the treatment of syphilis of the central nervous system cannot be overestimated. For this reason we have read with great interest a paper contributed to the *Archives of Internal Medicine* by Haller, in which he discusses the treatment of seventy-five patients treated with mercurialized serum and four hundred treated by the intraspinal injection of salvarsanized serum. The cases treated by the latter method have already been fully reported in the same journal during 1916. Having satisfied himself that the mercurialized serum was advantageous, when prepared according to the method suggested by Byrnes, he felt justified in largely employing it, since it has great advantages in that no previous treatment is necessary in its preparation, the serum can be obtained at any time convenient to the patient and physician, and, lastly, a large supply of the serum can be made up at one time and the individual doses can be used as needed over a period of several weeks. He studied some cases which had received salvarsanized serum as well, and so was able to compare the results of the two plans of treatment in one individual. The method of preparation of the mercurialized serum he describes as follows:

"In the preparation of mercurialized serum, blood is withdrawn from a vein and allowed to clot. The expressed serum is centrifuged in order to free it from cells. The serum is then pipetted into glass tubes in 8-Cc. amounts, and to each tube is added 0.001 gm. of mercuric chloride in a 0.1-percent aqueous solution. The fluid is agitated for a few moments in order to insure a thorough mixing. The white ring of precipitated albuminate of mercury quickly redissolves in the excess of serum, giving a perfectly clear solution. The tubes are plugged and the serum inactivated for thirty minutes at 56° C. They are then stored away on ice until needed, when they are warmed to body temperature and the serum is administered.

"The amount of serum used has seemed to be of relatively little importance, although excessive amounts probably add to the immediate reaction. From 6 to 8 Cc. has been the amount used in most of the doses given in this series, for the reason that about that amount of spinal fluid is usually withdrawn for cell count, globulin and Wassermann tests. The dose of mercuric chloride has been varied from 0.0005 to 0.002 gm. The degree of immediate reaction is not perceptibly changed by increasing the amount to 0.001 gm., but an increase above this figure has seemed to add materially to the discomfort of the patient. The length of time during which the serum was heated to 56° C. has been varied from twenty minutes to two hours without apparently affecting the degree of reaction. The age of the serum does not perceptibly add to its irritating properties. Several doses kept on ice for eight weeks and more were followed by less disturbance than many which were administered within twenty-four hours after preparation."

Haller states that the degree of reaction following the intraspinal injections is practically identical in both methods of treatment as to pain, nausea, fever, and general wretchedness, and thinks that a crisis may be precipitated by either plan of treatment. He also believes that the dosage and frequency of treatment with mercurialized serum depends largely on the individual features of the case. The first dose should be small to determine how the patient reacts. Curiously enough, he states that cases of general paresis, active meningitis, and cerebrospinal syphilis stand treatment better than cases of locomotor ataxia. To those with meningitis and cerebrospinal

syphilis he has given two treatments intraspinally each week for two or three weeks without severe reaction in any case; whereas two patients with ataxia could stand the administration of the serum only once in three months. The primary effect of either serum is to increase the number of cells. Occasionally red cells appear in the fluid, which is more common after the use of mercurialized serum than after salvarsanized serum.

Haller found it difficult to make a fair comparison between the efficacy of the two serums in relieving symptoms, but he concludes that the irritating effect of the mercurialized serum, when the bichloride has been added in the dose of 0.001, is greater than that produced by salvarsanized serum, the dose of which was 20 Cc. of salvarsanized serum obtained from blood drawn thirty minutes after a dose of 0.6 salvarsan. He believes, moreover, that the average effect on the laboratory findings in the spinal fluid from one dose of mercurialized serum is greater than from one dose of salvarsanized serum, but, on the other hand, unpleasant symptoms are more common after the former than after the latter, and, in seeming contradiction to the statement in the early part of his paper, in his conclusions he states that as mercurialized serum causes greater irritation of the meninges frequent repetition of doses is not as possible as with salvarsanized serum. Nevertheless, be believes that it is particularly in cases of active syphilis of the meninges that the mercurialized serum is useful. The only other advantages of mercurialized serum are its ease of preparation, keeping qualities, and the fact that it can be used under clinical conditions in which the use of salvarsanized serum is difficult or impossible.

Somewhat similar conclusions are arrived at by Mehrtens of San Francisco, who reports thirty cases with 190 injections treated by mercurialized serum. These cases, however, were old cases that had previously been given very thorough treatment with salvarsan and mercury with little result. In the series were seven cases of paresis, eighteen of tabes, and five of cerebrospinal syphilis. Mehrtens found that the reactions were usually quite severe, considerably in excess in severity to the Swift-Ellis method. Pains in the back and legs were almost invariable; headache, nausea and vomiting were not unusual; and in forty per cent of the cases albumin and casts appeared in the urine. This is an important observation, as the results of work of Schamberg and others show very clearly that mercury has a very great selective affinity for the kidneys, and if kidney lesions exist the use of mercurialized serum is probably more dangerous than the use of salvarsanized serum.

The mercurialized serum injections, according to Mehrten's observations, influence the Wassermann test more slowly than does salvarsanized serum. Indeed, out of his entire series he was only able to change five cases from a positive to a negative reaction, although in ninety per cent of the cases there was some reduction of the strength of the reaction. In general terms there was a diminution in the number of cells. The results in paresis were poor, four of the cases grew steadily worse, two remained stationary, and one only appeared to be arrested; in tabes the results were much more satisfactory, the majority returning to work with lessened pain and ataxia; the best results were obtained in cerebrospinal lues, every one of the five returning to work. It would appear, therefore, that salvarsanized serum is not by any means to be displaced by the injection of mercurialized serum, but that if, for any good reason, the salvarsanized serum cannot be employed, mercurialized serum offers a method by which beneficial results may be attempted.

POISONING FROM SUBNITRATE OF BISMUTH.

Fifty years ago and more cases of poisoning by subnitrate of bismuth were reported, characterized by evidences of gastroenteritis. Ultimately, however, it was found that these cases were not truly instances of bismuth poisoning, but were due to contamination of the bismuth by arsenic. With

the introduction of bismuth devoid of arsenic the idea that bismuth was capable of acting as a poison was dismissed from the medical mind, and it was not until massive doses of bismuth began to be given for *x*-ray examinations that it was recognized that bismuth itself was capable of acting as a poison. Later on its employment in large quantities in the treatment of suppurating sinuses added still further evidence of its toxic properties.

The poisoning may be divided into two types. In one there is inflammation of the mucous membrane of the mouth and gums, with marked pigmentation of the mucous membrane lining the cheek; the teeth become loosened; the tongue enlarged and possibly ulcerated; there may be profuse salivation, and the lymph nodes in the neck become enlarged, so that in many respects the patient resembles one who has been poisoned by mercury.

In a paper by Phillips, contributed to the *Cleveland Medical Journal,* he states in addition that convulsions may develop with trismus and nystagmus. Severe anemia may also be present, hemorrhage from the intestine may occur, and occasionally the red blood corpuscles become stippled in a manner similar to that which occurs in lead poisoning. So, too, an eruption resembling measles may develop on the skin, and the urinary signs of a toxic nephritis may be present.

In the second type of case the patient becomes cyanotic; the blood contains methemoglobin; the mucous membranes are discolored, and the patient may die within three hours. Such a rapid course, however, is unusual. In a case seen by the writer of this note both series of symptoms developed in an aged woman with carcinoma of the stomach to whom a full dose of bismuth had been given, but the symptoms did not come on until some days after the ingestion of the dose.

It has been shown that in the second type of case the poisoning is not due so much to the bismuth as it is to the liberation of nitrates in the intestine.

Notwithstanding the enormous doses of bismuth which have been given by a host of observers, to a multitude of patients, bismuth poisoning has very rarely happened, but to avoid it barium has now been substituted by roentgenologists.

In one case reported by Phillips, in the article to which we have referred, the patient was a man of eighteen years, who first complained of a sore mouth following the treatment of a persistent sinus which was treated with bismuth paste. He developed dark-gray, necrotic masses on the tongue, hard palate, uvula and the gums, with emaciation of the extremities, and albuminuria, with granular and hyaline casts. There was marked leucocytosis; the red cells were only slightly reduced. After ten days the slough in the mouth separated, leaving behind an oval pigmented area. He also developed convulsions three days after coming under observation, and diarrhea one week after, with mucus and blood in the stools. It was found that the rectal mucous membrane was also pigmented. Following the bloody stools marked anemia developed, so that two weeks after the patient presented himself his red corpuscles equaled 1,500,000, his hemoglobin 30 per cent, and the leucocytes 13,000; the differential count of the white cells showed nothing unusual. The patient died a little over a month after he was first seen. Phillips records these symptoms as being due to the bismuth.

He also records the case of a child who had been given only a drachm of bismuth subnitrate by the rectum because of colitis. Twelve hours later the child became nauseated, cyanotic, very weak, and partly comatose. The blood was very dark, but she recovered by colonic irrigation, and by the third day all the symptoms had disappeared. Similar symptoms developed in a man of fifty years, who had been given an ounce of bismuth subnitrate for an *x*-ray examination of the stomach. The next morning he became cyanosed and unconscious, his blood-pressure was very low, his blood very dark. He also was treated by colonic irrigations, active stimulation, and transfused with blood, and by the third day

was completely conscious and the cyanosis had disappeared. Porter considers that these two cases illustrate the type of poisoning which is due to the formation of nitrites.

UNTOWARD INFLUENCES OF THE SALICYLATES.

One of the most important subjects which can be studied by the practical physician is that which deals with the undesirable influence which may be exercised by drugs when they are administered for the purpose of removing certain symptoms, or curing certain conditions of disease. Unfortunately, practically every known drug has side effects even when it possesses considerable specific action, and because of idiosyncrasy, or because of the existence of certain changes in the functions, or the organic constitution of organs, by disease, these side effects may become dominant. In some instances the contraindications to the administration of an otherwise useful remedy may be so great as to absolutely prohibit its employment. Thus, where there is acute or subacute disease in the middle ear the administration of full doses of quinine may result not only in temporary but permanent impairment of hearing. A large number of instances might be cited illustrative of these facts. For these reasons investigations directed to the study of the side or untoward effect of drugs are always of interest and importance.

Two studies, one upon animals and one upon man, have recently been made by Hanzlik and Karsner, upon the changes in the kidneys which are induced by the administration of the salicylates in animals and persons whose kidneys are supposed to be normal, and in those in whom the kidneys were known to be diseased. They cite a good deal of the literature dealing with this important subject and, from their studies in animals, express the belief that the equivalent of full therapeutic doses to human beings when given to dogs, cats, and rabbits causes the appearance of albumin, leucocytes, casts, or cast-like bodies, and sometimes red blood-corpuscles in the urine, that a preëxisting albuminuria is aggravated by the administration of the salicylates, and that this albuminuria has a direct renal origin, or, in other words, is due to the influence of the drug upon the renal parenchyma. Changes in the non-protein nitrogen and urea of the blood would also seem to indicate that there is a diminution in renal functional efficiency, while microscopic lesions may be found in the kidneys varying from simple cloudy swelling of the epithelium of the proximal convoluted tubules to extensive cloudy swellings of all the cortical portions of the tubules, associated with an acute glomerulitis, or in other words an acute tubular nephritis.

In connection with their investigations upon human beings they reached conclusions which are practically identical save that they did not make any report upon the microscopical examination of the kidneys. They believe that the findings in the urine of normal, rheumatic, non-rheumatic, febrile, and afebrile persons are identical with those found in animals. They found that there was an increase in the non-protein and urea nitrogen of the blood, and the phenolsulphonephthalein excretion in human beings receiving the salicylates in what they called the "toxic dose" is retarded.

They do not believe that the administration of bicarbonate of sodium with the salicylates diminishes the evil influence of salicylates upon the kidneys. So far as we know, this is not the purpose for which bicarbonate is commonly administered. It is used rather to diminish the irritating effects of the salicylates upon the stomach, or to aid in the elimination of salicyluric acid, or, possibly, the poisons produced by the rheumatic infection.

While these investigations, if too seriously considered, might make physicians unduly timid in regard to the administration of the salicylates, nevertheless the fact that these changes are induced serves as a word of caution.

The doses administered to human beings,

so-called toxic doses, were administered in the form of sodium salicylate expressed as salicylic acid, and varied from three to five drachms. The method of administration consisted in giving 20 Cc. of a ten-per-cent solution of salicylate of sodium with 80 Cc. of water every hour until the subject complained of the well-known symptoms of toxicity. These doses are, of course, larger than are commonly employed. After this the drug was stopped, but the water was continued in the dose of 200 Cc. every two hours until no more salicylic acid appeared in the urine.

GUNSHOT FRACTURES OF THE FEMUR.

It is universally recognized that among the war wounds those involving the femur are the most difficult to handle. These fractures are practically always contaminated, are often extensively comminuted, are difficult to transport without further injury, are prone to prolonged suppuration, and where there has been much loss of bone substance are subject to lasting disability and deformity. It is also recognized that the treatment of these fractures to be efficient must be prompt and applied by a real surgeon, consisting as it does of wide opening, mechanical removal of all devitalized tissue by the knife, removal of foreign bodies, and provision for drainage, or, if the Carrel technique be used, for leakage, and fixation in a good position. This fixation implies not only splinting but, usually, traction. The apparatus which has been found most useful by European surgeons is the Thomas splint, generally applied with the leg in the straight position—an admirable piece of apparatus if carefully fitted, but, unless so adapted that pressure falls upon the ischium, and even then in the absence of the most scrupulous care, likely to be painful and to produce pressure ulcers. Eastman and Bettman (*Surgery, Gynecology and Obstetrics,* October, 1917), on the basis of military experience in Vienna, state the general feeling to the effect that at the front femur fractures should merely be put at rest and that all efforts to secure extension, however simple, should be delayed until the patient has reached the hospital in which he can remain for several weeks at least. The means for securing rest resolve themselves into plaster-of-Paris or starch casts, and splints. The cast, because of the accidents attending its use, has been discarded as dangerous at the front. The splints which figure as used by the Austrians are comparatively simple, aiming at fixation and neglecting traction, the simplest being in the form of two blanket rolls, or one or two pillows, secured to the thigh. The authors state that adhesive plaster is extremely scarce in Germany and Austria, that, even were it common, Buck's extension is often not serviceable because the lacerated wounds encountered make its application difficult or impossible. In lieu of adhesive tapes they used strips of Canton flannel applied as is the adhesive plaster in Buck's method and held in place with glue known as mastesol, consisting of powdered resin 50 grammes, alcohol 50 grammes, benzine 25 grammes, Venice turpentine 5 grammes. The mastesol is spread over the rough side of the Canton flannel and applied over the skin surface as well. A spiral reverse gauze bandage holds the flannel strips smoothly and firmly against the varying diameters of the extremity. The mastesol thus applied will resist an extension weight of ten or fifteen kilos for several weeks. A firmly woven stocking or a well-fitting drawers' leg may be used to replace the strips of flannel. Pressure on the malleoli from the stocking may be prevented and an equal pull all around be obtained by incorporating an iron ring in the flannel strips or tricot just above the ankle.

Both extension and splints should be so applied that the dressing can be changed without moving the limb. Indeed, scanty dressing and the open treatment of the wound are strongly advised. It is noted that mastesol glue sometimes tears the skin and frequently produces dermatitis. A shoe upper is proposed as an alternative means

of suspension. It is stated that with the Steinmann pin it is possible to overcome partial union in cases in which weeks or several months had elapsed after injury. The authors naively remark that the pin does not cause pain if properly applied—*i.e.*, if the skin is retracted upward during the introduction of the pin; they observe, truly, that an extension of 30 or 40 pounds may be applied by pulling directly on the fragment of bone itself, and express a preference for the Schmerz clamp in making extension, this being simply a modification of the ice-tongs pull. This can be applied to the condyles of the femur, the tuberosities of the tibia, to the malleoli or to the os calcis. They state that these clamp wounds do not become infected providing the skin be retracted upward during the application, and no holes be cut in the soft parts in introducing the pin. The pin itself should be bored and not driven through the skin and soft tissues overlying the bone. Wounds are left open and exposed to sunlight whenever possible. Rubber tubing was used for drainage whenever needful. An irrigating can was placed over the bed and the wound continuously douched with the sodium hypochlorite solution of Dakin, through-and-through drainage often being employed. Bandages and gauze packs and dressings were discarded as far as possible, to minimize foreign body reaction. As a deodorant the old plan of using coarse granulated sugar was advocated.

In summation of the Austrian method of treatment of open fractures of the femur, such authorities as von Eiselsberg and von Harburg being quoted, it is obvious that the Dakin-Carrel method had reached those surgeons only as an echo; that from the diversity of the appliances pictured and applied a uniform method of treatment had not been accepted; and that, whilst regarded as of major import, traction was not considered an essential part of rest, as it really is, in cases of fracture of the femur. It is also noteworthy that the Austrian surgeons had early recognized the futility and wastefulness, indeed positive hurtfulness, of pus poultices, commonly called absorbing dressings, and had utilized to the full the beneficial effects incident to exposure to light and air.

Writing on the same topic and basing his remarks on an experience as Director in the American Red Cross Unit of the Hôpital de l'Ocean, LaPanne, Belgium, W. A. Clark notes that badly lacerated wounds are usually due to shrapnel or shell, but may be produced by exploding bullets, expanding bullets, or by bullets striking bone. The shrapnel balls have little penetrating power and are rarely found deep in the tissue. The writer uses the descriptive term of "shattering" fracture for those encountered in war, since they differ from those seen in civil practice. It is noted that the French have adopted the treatment of total removal of the fragments. This should conserve life and limb, if not function There is a general consensus of opinion that fragments of clothing and dirt, all blackened tissue, and the bullet should be removed. In rifle-ball fractures in which the shattering of the bone is not attended by extensive wounds of the soft parts, it is first of all necessary to open wide on both sides, even if there be no wound of exit. The wound being large, the bone can be removed as occasion demands. Extensive shell wound of the upper thigh is regarded as sufficient indication for primary amputation. The fatalities from secondary hemorrhage and gas gangrene are so numerous as adequately to justify this procedure. The Thomas splint is regarded as the best for fracture not only of the femur, but for all shattered fractures of the leg. For the femur, except fractures at the neck or the trochanter, the Thomas knee splint swung from above, with traction from its lower end and perineal counter-pressure, is regarded as the best treatment. If the fracture be at or above the trochanter abduction must be maintained. A winding bandage should not be employed. It is noted that amputations are done by a transverse cut, and after this technique was adopted, as opposed to the former more surgical one, the mortality was cut in half,

though this reduction was not attributable entirely to the method of amputation.

The present attitude along all the Allied fronts is that fixation, traction, knife, and forceps, cleansing of the wound at the earliest moment, provision for drainage, and avoidance of transportation are the cardinal features in the treatment of the contaminated open fractures of the femur.

SHOCK.

This important topic, the true nature of which, in so far as its cause is concerned, remains a mystery, as does an efficient therapeusis when it has reached a certain stage, is again reviewed experimentally by Guthrie (*Journal of the American Medical Association,* Oct. 27, 1917), who publishes a summary of work conducted by the staff members of his department and extending over a number of years. His general plan was to devise a reliable and comparatively simple method of producing shock, to establish definite criteria for recognizing the condition, and to observe and study quantitatively at frequent intervals throughout the experiment as many phenomena simultaneously as was feasible.

The experiments were made on 22 dogs and comprised blood-pressure, pulse-rate, and character; vasomotor reflex response; vasomotor tone; respiration rate, amplitude and regularity; volume and composition of expired air; blood hydrogen-ion concentration, reserve alkalinity, hematocrit and hemoglobin tests, red cell count and specific gravity determinations, estimation of the total blood contained in the vessels of the alimentary canal and in the vessels of the liver; viscosity and depression of the freezing point of blood; and temperature and condition of the general reflexes. Comparative studies were instituted on conditions observed in shock and in conditions following cerebral anemia. The effects of remedial measures were observed, such as mechanical increase in cerebral pressure, by occluding the aorta; elevation of the posterior portion of the animal to facilitate return of blood to the heart; and administration of drugs, including epinephrin, tyramin, atropine, sodium bicarbonate, lactic acid, and inhalation of carbon dioxide.

The results, if not chaotic, were conflicting and inconclusive. Perhaps the most important one being a corroboration of the value of what the author calls elevation of the posterior parts of the body, or what surgeons call lifting the foot of the bed with the view of increasing a return of blood to the heart and adding a hydrostatic factor to the cerebral blood-pressure; increase of peripheral resistance, as by aortic compression; and, particularly when associated with severe hemorrhage, increase of blood volume by transfusion of blood, or the intravenous injection of isotonic non-toxic solution, as sodium chloride.

The recent observations of Sansum are quoted as to the effect of increasing blood-pressure by intravenous injection of strongly hypertonic glucose solutions. It is further noted that the temperature, if low, should receive attention and that the best results have been obtained by epinephrin solution intravenously.

Sodium bicarbonate as a therapeutic measure seemed experimentally to rank with lactic acid. Nor was carbon dioxide found efficacious.

In contrast with this experimental work are Crile's clinical observation at the front, to the effect that shock is best treated by psychic cheer, physical comfort, elevation of the foot of the bed, heat applied by electric light bulbs, and transfusion until at least the blood-pressure is raised to within safe limits. Digatalone is commended; morphine for pain, when there is no cyanosis. Sleep, natural sleep, secured by quiet and comfort he considers the greatest restorative.

REPORTS ON THERAPEUTIC PROGRESS.

EMETINE DIARRHEA—CLINICAL AND EXPERIMENTAL.

In the *Archives of Internal Medicine* of August 15, 1917, KILGORE and LIU report three cases in which the diagnosis of emetine diarrhea, produced in the course of treatment for amebic dysentery, is reasonably certain. Recovery was prompt on discontinuing the emetine. The authors have seen a fourth case, terminating fatally, in which the same diagnosis was made, but have not reported this case in detail on account of failure to secure a necropsy.

All of these cases were in children and all had received doses considerably larger than would be proportionate on a basis of 65 mg. (1 gr.) for an adult. This fact is especially interesting in view of the opinion not infrequently held that children are more resistant to emetine than adults. It is the present practice of the writers to give doses of 65 mg. (subcutaneously or intravenously) to adults and to graduate doses for children proportionately, watching carefully for any increase in the diarrhea which might be due to emetine.

Experiments of others and those reported here furnish abundant evidence of the tendency of emetine to produce in dogs a hemorrhagic gastroenteritis with hemorrhages in the lymph glands, spleen, kidneys, thymus, etc., ultimately resulting in death, even if the emetine be stopped as soon as definite symptoms are observed.

TWILIGHT SLEEP.

To *Medicine and Surgery* for August, 1917, DORLAND contributes an article in the course of which he has this to say of twilight sleep:

The desire to alleviate the suffering of parturition, at least to an appreciable degree, is universal, and various suggestions along this line have been made from time to time. About fifteen years ago a pretentious move in this direction advocated the use of narcotics to deaden the pains of labor. Not only abroad, but in this country as well, this suggestion was thoroughly tested, only to be reluctantly abandoned because of the serious and even fatal results both to mother and child which followed in many cases. A few years ago the method was revived with certain improvements, and having been adopted by the Freiburg Clinic it was widely exploited in Germany and France and more recently here under the absurd name "twilight sleep." Enthusiastic followers of the scopolamine-morphine method sprang up as if by magic all over the country, and extravagant claims were circulated to prove its excellence and superiority over similar methods in vogue.

In the meantime the maternity departments of many reliable hospitals instituted a careful scientific study of the method, some in selected cases and others generally in their maternity work. From these studies there slowly accumulated sufficient accurate data to prove conclusively that the method was fraught with such dangers for both mother and child as to render its further use unwarranted. The Johns Hopkins Hospital of Baltimore, the Mt. Sinai Hospital of New York, the Michael Reese Hospital of Chicago, and other large and reputable maternity hospitals issued authentic reports containing warnings to the profession and general public and condemning the method unqualifiedly. However, notwithstanding the wide publication of these condemnations, certain physicians have continued the use of the method, and by every means within their power, legitimate and otherwise, have let the public know that they are engaged in this work.

In the face of honest protestations from the reputable obstetricians of the country, who would gladly indorse and support any safe means of relieving the pangs of childbirth, such persistence must be regarded as unethical and done for one purpose only. It is an exploitation for commercial reasons—for the profit that is in it. Thousands of women, not knowing the risks that they

and their offspring are running, eagerly submit to the method which is advertised by these unscrupulous physicians and which is proclaimed broadcast by equally unscrupulous and vastly more dangerous periodicals that publish beautifully written and alluring descriptions of the wonderful boon conferred upon suffering womankind. It has even been stated that mankind generally and male physicians especially lack the proper sympathy for women in childbirth, or they would adopt any measures which might be proposed for their relief. This untruth is most invidious and unkind. No more whole-hearted, sympathetic and devoted group of men can be found than those in the medical profession. Their reluctant abandonment of the scopolamine-morphine treatment because of its danger and their eager response to the nitrous oxide anesthesia, as more recently advocated by eminent obstetricians in this country, prove their loyal devotion to the mothers of the land. "Safety first," however, is their ethical and honest stand; and in the strength of their position and with the support of recognized science behind them, they calmly face the shrewd and unethical advocates of unsafe and discarded methods while educating the public to a true understanding of the situation.

THE ORGANOTHERAPY OF MENSTRUAL DISORDERS.

To *Medicine and Surgery* for August, 1917, NOVAK writes that the treatment of uterine bleeding of hypothyroid origin is simple enough, consisting essentially in the administration of thyroid extract. It must not be forgotten that this substance is a powerful agent whose use must always be rigidly supervised by the physician. Excessive dosage gives rise to the characteristic symptoms of hyperthyroidism, such as tachycardia and tremor. When abuse of the drug is protracted, serious injury may be inflicted upon the cardiovascular system.

The average dosage of thyroid extract in these cases of mild hypothyroidism should never exceed five grains a day, and in most cases it will be much less. The patient should be observed at least once a week to determine her tolerance and to make sure that no harm is resulting from the use of the thyroid. The principal criterion should be the condition of the heart. If the heart-rate is not accelerated, one may feel assured that no hyperthyroidism exists. If, on the other hand, it is found that the use of the thyroid is accompanied by a gradual mounting pulse-rate, together with nervousness, tremor, etc., the dose should be cut down. For prolonged administration one or two grains a day is often sufficient.

An important guide to the action of thyroid extract is its effect upon the body weight, which is practically always diminished. This, as is well known, is the result of a stimulating effect upon the oxidation processes in the body. It is seldom advisable for the patient to lose weight at a faster rate than two or three pounds a week. The total loss of weight depends, of course, upon the initial body weight and upon the duration and intensity of the treatment, as well as upon such adjuvant measures as dietetic regulation, exercise, etc. In suitable cases the treatment yields striking results within a month, menstruation becoming normal and the health being improved in every way. Instead of discontinuing the thyroid medication abruptly, it is wise to diminish the dosage gradually, and to keep up small doses for a considerable period of time.

Pituitary extract has always been employed in the treatment of uterine hemorrhage. When the latter is due to atony of the uterine muscle, as in postpartum or postabortive cases, the results are, as is well known, highly gratifying. This cannot be said of uterine hemorrhages of other types. The feeding of pituitary extracts by mouth is attended with as little success in the usual case of non-obstetrical uterine hemorrhage as in most other conditions in which it has been used. Somewhat more satisfactory appear to have been the results when pituitary extract has been given subcutaneously or intravenously. The latter method, in the hands of Kalledey, is stated to have yielded good results. Such reports,

however, are still too few to make any great impression on therapeutic practice. In spite of Kalledey's contention to the contrary, it seems likely that any hemostatic effect exhibited by pituitary extract in these cases is due to the resulting tonic contraction of the uterine muscle rather than to any corrective endocrinal effect.

A STUDY OF EXOPHTHALMIC GOITRE FROM THE POINT OF VIEW OF THE BASAL METABOLISM.

In the *Journal of the American Medical Association* of July 7, 1917, MEANS and AUB reached these conclusions:

1. The general metabolism shows a characteristic increase in hyperthyroidism.

2. This rise may be used as a functional test of the thyroid activity or as an index of the intensity of the thyroid intoxication.

3. An extended study of the metabolism in various types of toxic goitre shows that:

(*a*) Rest alone usually causes a marked decrease in toxicity.

(*b*) Drugs in addition to rest do not materially accelerate this decrease.

(*c*) The Roentgen ray, in some cases, produces a definite improvement, while in others it seems to be quite without effect.

(*d*) The usual immediate effect of surgery is a marked decrease in toxicity, but there is a very definite tendency toward a subsequent recurrence.

4. The lesson in therapeutics to be drawn from these results they believe to be about as follows:

(*a*) Complete rest in bed plus irradiation should be continued until the metabolism reaches a level.

(*b*) If rest and the Roentgen ray fail to restore the metabolism to within 20 per cent of the normal, it is proper to resort to surgery, unless there is some definite contraindication. Among contraindications a rising metabolism, in spite of complete rest, seems to be very important.

(*c*) Following operation, if the metabolism again increases, further active treatment should be carried out. The observations in the cases that the writers have followed for a long time emphasize the importance of keeping cases of exophthalmic goitre under observation for months rather than weeks, and preferably years rather than months.

RATIONALE, INDICATIONS, AND CONTRAINDICATIONS OF THE NAUHEIM BATH.

To the *Medical Record* of August 18, 1917, LIEB of Watkins, N. Y., contributes quite an exhaustive paper on this topic. He points out that an estimation of the heart's functional capacity should be a prerequisite to a determination of the heart's fitness for the Nauheim baths. When we consider the contraindications for the treatment, however, anatomical morbidity is largely the determining factor. When after a comprehensive clinical and pathological survey of a patient, objections to the baths have been ruled out, we may proceed with the treatment with great assurance of success. While it is impossible to make a cut and dried list of contraindications to the Nauheim baths, yet the writer's experience has amply demonstrated, to him at least, that the following conditions are inapplicable to the method: Cardiac insufficiency with marked edema, dyspnea, or Cheyne-Stokes breathing; tenderness of the liver or effusion into the serous cavities; cases in which cardiac failure is progressing with great rapidity; severe cases of angina pectoris; all extended degenerations of the heart and arterial system; blood-pressure over 200 with high diastolic pressure; aneurism; recent cerebral hemorrhage; aortitis; all but the milder cases of aortic stenosis and insufficiency; the advanced stage of mitral stenosis; all inflammatory diseases of the heart associated with fever, such as myocarditis, endocarditis, and pericarditis. If in this latter condition adhesions have formed, no good can come from the treatment except by combating the functional disturbance present. If fresh endocardial changes are present the Nauheim baths should not be given. Of especial danger in old valvular lesions is the frequency of recurrent attacks of endo-

carditis following the acute infections. Care should be taken that the baths are not given at such a time. Congenital and well-compensated valvular lesions, though not contraindicating the baths, are not benefited by them.

The success of the carbonated brine bath in the treatment of circulatory affections varies in the hands of different practitioners like that of any other therapeutic procedure. Its scope of application is bounded by sharp limitations, which, if ignored, lead to disappointing and even disastrous results. Administered rationally as to duration, strength, and individualization it ranks as one of our most efficient upbuilders. In some cases it may be used as the sheet-anchor of treatment, in others simply as an adjunct. The method does not preclude the simultaneous use of drug therapy. In fact, the error is too often made of discontinuing digitalis medication directly the carbonated brine therapy is instituted. Not until the effect of the baths has been determined should digitalis be withdrawn, and then only gradually. In consequence of inattention to such details and the frequent haphazard methods of application the carbonated brine cardiotherapy is suffering from cold medical indifference. This is entirely unwarranted, as evidenced by the success with which the method has been attended when scientifically applied.

BROMOFORM IN WHOOPING-COUGH.

In *The Prescriber* for August, 1917, ALLAN recalls the fact that in the March issue of *The Prescriber* there appeared an interesting abstract regarding the use of bromoform in whooping-cough. The author, Dr. Neal Kitchens, gave most explicit directions as to the mode of administration, and he attributes the disappointing results sometimes met with to wrong methods of exhibition of the drug. Allan has had a fairly large experience with bromoform in the treatment of whooping-cough, and thinks a few observations based on his own experience may not be out of place.

In the first place, with regard to dosage, Allan has been in the habit of giving one minim of bromoform every four hours to an infant one year of age. To a baby of six months half the dose is given, and to an infant two years double the dose mentioned in the first instance. Dr. Kitchens's method of giving one drop of bromoform for each year of age up to five is a rough indication, but quite safe guide as to dosage, although personally Allan generally found that with older children a smaller dose was quite as effective and would suffice; for example, to a child aged four years, 2½ or 3 minims for a dose might act just as well as the full maximum dose of 4 minims. Allan's results with this medicament led him to the conclusion that in bromoform therapy individual consideration is very important, and in each case every endeavor should be made to obtain the *maximum* effect with the *minimum* dose.

Dr. Kitchens is most emphatic in maintaining that bromoform should never be compounded with anything. Allan cannot quite agree with him on this point. Certainly he never appeared to get quite such good results when the bromoform was combined with another sedative drug, but in the form of a mixture such as that given below it invariably yielded satisfactory results. Allan's usual formula for an infant of one year of age was: Bromoform, 1 minim; spirit of chloroform, 3 minims; mucilage, q. s.; aquæ anethi, q. s. ad 1 drachm. He has never experienced any difficulty in getting children to take this mixture. It is often advisable to add one minim of tincture of strophanthus to each dose, and if thought necessary some flavoring agent may be included. The mixture will not keep indefinitely, and it should never be kept as a "stock mixture." Sufficient to last for twenty-four or thirty-six hours only should be made at one time. Probably it is best to put up each morning the amount that will be required during the succeeding twenty-four hours, and what is left over should be discarded. It is very important that the bottle should be thoroughly shaken before the dose is poured into the measure glass, and it is also important to remember that

the teaspoonful dose ordered is a medicinal teaspoonful, and not the indefinite quantity likely to be given when a domestic teaspoon is employed. Accurate measurement of each dose should be strictly enforced.

In the use of bromoform in the way thus indicated there is a marked effect in reducing the severity of the paroxysms and in prolonging the intervals between the paroxysms of coughing. So long as the severe paroxysms persist the full dosage at four-hourly intervals should be maintained, but when the attacks become less frequent, and especially when their severity begins to lessen, the dose may be reduced. To begin with, the mixture may be given at six-hourly intervals, then three times a day, and lastly twice a day. The reduction in dose must be gradual, and must be based on personal observation in each individual case. There must be no rule-of-thumb method, or disappointing results will almost certainly follow.

Allan does not assert that bromoform will be effective in every case of whooping-cough, but he does say that in the majority of cases it is a most efficacious remedy in this disease, when administered carefully and conscientiously on the lines indicated above.

THE RELATION OF THE PITUITARY GLAND TO THE FEMALE GENERATIVE ORGANS.

In *Surgery, Gynecology and Obstetrics* for September, 1917, GOETSCH tells us that in the obstetric clinic of the Johns Hopkins Hospital, Williams is making rather extensive use of pituitary liquid. The indications for its use have been grouped under three heads.

In the first place pituitary liquid is used in primiparæ only when the head is beyond the spines and on the perineum, thus assuring free passage to the head. In multiparæ it is used frequently even when the head is at the spines, no bad results having been seen in its use at this stage. The general results have been very satisfactory, and as a consequence of this therapy there has been a very considerable reduction in the use of forceps.

The second use of this drug by Williams is for the arrest of hemorrhage postpartum, instead of ergot. It acts more rapidly than ergot—inside of three to five minutes—and is always followed by the latter given hypodermically. In cases of severe hemorrhage, or in which further hemorrhage is feared, ergot may also be given by mouth. The reason for this mode of treatment lies in the fact that the effect of pituitary liquid is rather transient, the subsequent administration of ergot being intended to cause continued contraction of the uterus after the effect of the pituitary drug has worn off. For a similar reason pituitary liquid is used in cases of complete uterine atony after forceps have been applied.

The third use is in cases of Cæsarian section in which this drug is used as a prophylactic against hemorrhage. Formerly a hypodermic of 1 ampoule (1 cubic centimeter) of the drug was given just before the beginning of the operation. This time was chosen on a basis of allowing three minutes for delivery, since the action of the drug is rather rapid. However, in cases of inability to deliver in three to five minutes as a result of operative difficulties, there is a distinct danger of asphyxiation of the child. Consequently this mode of administration was given up and a change was made in the time of the injection of the drug. At present the syringe is ready, the ampoules are previously sterilized, and the injection is given directly into the posterior wall of the uterus just as soon as the baby is delivered. The action of the drug is very rapid, the uterus contracts powerfully and usually becomes board-like in 1½ to 2 minutes. This treatment has now become the routine in these cases and the results have been very satisfactory.

The pituitary liquid is not given at all in Williams's clinic in the primary stage of labor. In a few earlier instances in which the drug was given at this stage, violent pains were produced of such severity that chloroform had to be administered to the patient. No serious results were experienced. However, the principal dangers that should be mentioned are rupture of the uterus when the drug is given in the first

stage when the cervix is not dilated, and particularly in cases of weakness of the uterine walls. The second major danger is asphyxiation of the child in those cases in which rapid delivery subsequently becomes impossible. The drug acts in three to ten minutes and the effect lasts for three-quarters of an hour to one hour. If it has not acted in ten to fifteen minutes it is safe to repeat the dose. Frequently it is found that ½ Cc. is just as effective as 1 Cc., and repeated doses when indicated can be given without danger, except of course those mentioned. Since the action of pituitary liquid is rather transient, there is still a definite use for ergot, which is used very extensively secondary to the previous treatment with pituitary liquid. The latter has also been used for the relief of distention with considerable success. For the relief of this condition the treatment is the same whether the patient is a primiparous or multiparous woman. No disagreeable after-effects from the administration of this drug have been observed, such as nausea, vomiting, collapse, or disturbances of the circulatory system.

TRUTH ABOUT INTRASPINAL INJECTIONS IN THE TREATMENT OF SYPHILIS OF THE NERVOUS SYSTEM.

In the *Journal of the American Medical Association* of September 1, 1917, SACHS opposes this plan of treatment and states that some of the ardent advocates of the intraspinal method are beginning to see the light; and since they have acknowledged, as Amoss did recently, that the virus in poliomyelitis within the brain and spinal cord cannot be reached by intraspinal treatment alone, they will also be compelled to concede that what is true of the poliomyelitis virus must also be true of the syphilitic virus similarly located within the tissues of the central nervous system. Physiologic evidence is therefore wholly adverse to the claims of those who favor intraspinal injections of salvarsan for the cure of syphilis of the nervous system. But there are other reasons why the method is not satisfactory, and chief among these is the greater danger attendant on intraspinal therapy. Furthermore, the successful treatment of many of these cases of syphilis of the nervous system calls for intensive salvarsan treatment, by which Sachs means intravenous injections of 0.3 or 0.4 gm. of salvarsan repeated every three or four days until the patient has had from fifteen to twenty or even fifty injections. A similar number of lumbar punctures for the purposes of intensive treatment would necessarily prove most disagreeable, if not harmful, to the patient; but beyond all these facts it has been definitely ascertained that the serious forms of general paresis or of tabes dorsalis have not been favorably affected by intraspinal injections, and nothing has been accomplished by them that could not have been achieved by the intravenous method.

Sachs is entirely in sympathy with Halliburton's view that "particularly regrettable is the divorce between those who pursue their investigations by the bedside and those who work in the laboratory." It is especially regrettable, Sachs would add, that changes in biologic findings should be made the criterion of the efficiency of any therapeutic method. Claims were made for the intraspinal method chiefly by men whose interest was centered on a change in the Wassermann reaction, in the reduction of the cell count of the cerebrospinal fluid, and in the change in the globulin reaction, rather than on clinical improvement in the condition of the patient. After all, the patient remains the chief consideration. One may speak glibly of remissions in general paresis and of improvement in tabes dorsalis, but it takes the experience of the trained neurologist and psychiatrist to estimate at their true value changes in clinical symptoms.

In many particulars the advantages of the intraspinal method have been grossly exaggerated. The opinion has reached the laity, as promulgated by advocates of the intraspinal method, that now general paresis can be cured and by the intraspinal method alone. Sachs has personal knowledge of patients suffering from general paresis who have been treated persistently and on innumerable occasions by intraspinal injec-

tions administered by the chief apostles of this method. Some of these patients have had remissions, but Sachs doubts whether a single one has been definitely cured, while all the others have taken the natural but gradual course toward a fatal termination. As for the remarkable reduction in the number of lymphocytes and the change in Wassermann reaction claimed as a result of the intraspinal method, Sachs asserts definitely, and the truth is already known to many, that the same changes have followed on intravenous injections, pure and simple, on repeated lumbar punctures, and on the introduction of the patient's non-salvarsanized serum. Evidently the changes in the cerebrospinal content may be brought about in a number of different ways.

Sachs does not for a moment question the accuracy of the attractive tables published by the advocates of the intraspinal method, but of one thing he is very certain, that there is absolutely no correspondence between a change in the cerebrospinal content and the condition of the patient. He could instance patient after patient, and some of them he has been able to demonstrate to others, in whom after both intraspinal and intravenous treatment, for general paresis or for tabes dorsalis, there has been no change in the Wassermann reaction or in the number of cells in the cerebrospinal fluid, and yet the patient has shown most satisfactory improvement in his general condition.

MEANS OF PREVENTION AND SPECIFIC TREATMENT OF EPIDEMIC MENINGITIS.

In the *Journal of the American Medical Association* of September 1, 1917, FLEXNER states that the more effective means of dealing with "carriers" is by making the application of chloramine in an enduringly active form a simple procedure. Dunham and Dakin have devised and recommended a solution of dichloramine-T in oil and applied by means of a hand spray designed for paraffin oil. With such a spray it has been found possible to render the nasopharynx sterile for aerobic bacteria in a few hours. Subsequently bacteria reappear, of course, from the dust, etc. Thus far only a small number of tests on carriers of the meningococcus have been made, but the results are promising. The method of procedure is here given:

1. The nose is cleared with salt solution or with 0.25-per-cent aqueous chloramine-T solution either by spraying or irrigation. The nose should be blown into a handkerchief between applications; and the chloramine-T solution should be used thoroughly as a gargle.

2. When the increased flow of secretion from the nose has subsided, the oil solution of dichloramine-T is applied with an oil atomizer. The oil spray should be repeated at intervals so as to make at least four treatments daily about equally spaced from each other. The spraying should be thorough and the oil carried to all parts of the membrane accessible. The first few applications of the oil sometimes occasion sneezing, but tolerance is soon acquired and subsequent applications cause no inconvenience.

3. The preparation of the dichloramine-T oil embraces three steps:

First, the solvent eucalyptol (United States Pharmacopœia) is chlorinated. Five hundred Cc. are treated with 15 gm. of potassium chlorate and 50 Cc. of concentrated hydrochloric acid for twelve hours or longer, and then well washed with water and with sodium carbonate solution. The water is drawn off and 15 gm. of dry sodium carbonate are added to the oil, and the whole is allowed to stand for twenty-four hours. The oil is filtered off, and dried with a little solid calcium chloride, when it is ready for use.

Second, the paraffin oil is chlorinated. To 500 Cc. of commercial paraffin oil 15 gm. of potassium chlorate and 50 Cc. of concentrated hydrochloric acid are added, and the mixture is exposed to light, preferably sunlight, for several hours. It is then transferred to a separating funnel and washed successively with water, a solution of sodium carbonate, and again with water. The opalescent oil is drawn off, solid calcium chloride added, in small quantity, and about

5 gm. of animal charcoal. On subsequently filtering through paper, a yellowish oil ready for use is obtained.

The third step is the preparation of the oil solution of dichloramine-T for use in the spray. Two-tenths gm. of the dichloramine is dissolved in 2 Cc. of the chlorinated eucalyptol without heating. When the solution is complete, 8 Cc. of the chlorinated paraffin oil are added. After mixing, the solution is ready for use. The solution contains 2 per cent of dichloramine-T. It is relatively unstable, and should be discarded as soon as a distinct precipitate makes its appearance. An opalescence or moderate cloudiness is not evidence of material deterioration. It is a safe rule not to use the completed solution for more than three or four days after its preparation. It should be protected from strong light and is best kept in a cool place. Where large quantities are needed, a stock 10-per-cent solution of dichloramine in eucalyptol may be prepared and kept on hand in a cool, dark place for dilution with the paraffin oil, as 1:4, as required. The eucalyptol solution will suffer little deterioration in a month.

THE CARE AND FEEDING OF THE PREMATURE INFANT.

In the *Archives of Pediatrics* for August, 1917, BROWN and GEORGE conclude a paper with these words:

The weight of a premature infant is the best criterion as to the prognosis. From their observations, it may fairly well be assumed that a child weighing more than 3¾ pounds will probably live, and under that probably die. If an infant weighs under three pounds the chances are very poor; every ounce over three pounds improves the prognosis. In spite of this, however, one must not despair of the very smallest infants. The early exhibition of breast milk and the continuance of this through the early months offer the best means at our disposal for insuring survival and combating the various complications to which the premature infant is prone. The premature infant should be carefully observed, especially during the first year, and rickets and anemia to which they are subject should be met by proper therapeutic measures.

ACIDOSIS IN INFANCY AND CHILDHOOD.

The *Archives of Pediatrics* for July, 1917, contains an article by A. D. SMITH in which he says the treatment should be directed toward neutralizing the acid intoxication, alleviating its symptoms, and removing the predisposing conditions. This consists in keeping the patient in bed and as quiet and free from excitement as possible, the administration of alkalies by mouth or rectum, catharsis, rectal irrigation, and diet.

Sodium bicarbonate given by mouth should be well diluted, and when so given is retained in the majority of cases. The dilution should be at least 1 in 30, and frequently weaker dilutions up to 1 in 60 are better. If 1 drachm is given each hour the urine will become alkaline in twenty-four to thirty-six hours. Potassium and sodium citrate are alkalies of second choice. They may be given ½ to 1 drachm every hour in a concentrated solution, 1 ounce of salt to 4 ounces of water. The administration of the alkali should be continued a few days after the subsidence of the acute symptoms.

The combined use of sodium bicarbonate and lactose is considered by some to be more effective than soda alone. Smith's experience leads him to corroborate this view. When used in this way the soda may be given every two hours, alternating with the lactose solution. This medication is much more effective when given by mouth.

For the prompt and thorough emptying of the intestines 1 grain of calomel in divided doses, followed by milk of magnesia, or citrate of magnesia, may be used. A large enema of normal saline or soap-suds given as high as possible also helps in emptying the intestines.

Even in the absence of vomiting it seems a rational procedure to stop all food until medication has been given for a few hours. If vomiting is present even liquids, except in extremely small quantities, should be

withheld until it stops. A little cracked ice or diluted brandy and cracked ice may be given. When food is commenced a barley-lactose solution is a good stepping-stone to more food. After this Smith begins with a food low in fat, such as skimmed milk with or without lime water, and then adds rice water, oatmeal water, orange juice, grape juice, cereals, crackers, toast, and broths. Proteids can be used in the form of casein, gelatin, soy-bean flour.

Other medication recommended has been: (1) Subcutaneous or intravenous injections of dextrose or levulose up to 10 per cent in normal saline; (2) intravenous injections of salt solution; (3) stomach lavage; (4) subcutaneous injection of sodium bicarbonate; (5) venesection, withdrawing 500 Cc. of blood and putting in 500 Cc. normal saline with 10 grammes of sodium bicarbonate. [This amount of blood, taken from a young child, seems to us too large.—Ed.]

PHYSIOLOGIC ACTION OF OLIVE OIL.

In the *Proctologist and Gastroenterologist* for June, 1917, Asnis states that the diseases of the stomach that are benefited by the use of olive oil either alone or in combination with other drugs are as follows: (1) Hyperacidity, no matter what its origin; (2) erosion, fissures, and ulcers; (3) pyloric spasm, no matter what its cause; (4) diseases of the biliary tract, such as cholecystitis, and Asnis ventures to say cholelithiasis in a limited and selected number of cases; (5) certain types of diarrheas and dysentery, constipation, dilatation of the stomach due to pyloric spasm, ulceration of intestines, malnutrition.

As to hyperacidity, most investigators agree that oils decrease secretion of hydrochloric acid, although it is not clear how this inhibition of gastric secretion operates. Pawlow believed that it is due to reflex stimulation of the inhibitory center of the nerves, while Munson claims that the action is purely mechanical; but that it does inhibit the flow of acid gastric juice is not disputed.

Given a case of hypersecretion with hyperacidity, olive oil in Asnis's judgment has more advantages, everything being equal, and less counter-indications, than any of the standard remedial agents used. It does not constipate like bismuth salts. It does not have to be watched as closely as the use of belladonna or atropine. Silver nitrate and its other salts are of little use in the usual small doses given, and the dangers of argyria are certainly not to be forgotten when larger and continuous doses are resorted to. Alkalies, such as sodium bicarbonate, magnesia salts, only neutralize and at best are only of temporary benefit. It seems to Asnis therefore that the omission of olive oil in hyperacidity and hypersecretion, and even in hypermotility, is at best incomplete therapeutics.

Because hydrochloric acid has no effect on the olive oil, and because of all foods it remains longest in the stomach, hence as a lubricant and as a protective agent it is unexcelled.

Given a fissure, erosion, or ulcer of the stomach, what are its pathologic manifestations, and to what are they due? The most important clinical symptom is pain. The pain is due to two factors, namely, secretory and motor. The secretory factor is the constant irritation of the acid juice upon the eroded, fissured, or ulcerated area, thus keeping the ulcer actively engaged. The motor factor is the irritating and stimulating action of the erosion, ulcer, or fissure on the muscular ring of the pylorus—thus producing a pyloric spasm. The healing of the ulcer, erosion, or fissure is also prevented by the spasmodic contraction of the pyloric ring. Here again two active factors are concerned in keeping the injured mucous membrane from healing—the chemical action of the acid and the physical action of the musculature.

In view of the pathology and of the clinical symptoms the medical treatment demands a drug that will reduce the irritating factor, namely, the hydrochloric acid, protect the injured mucous surface, and overcome the pyloric spasm. Here again the demonstrated physiological action of olive oil is of exceeding value. By its use almost all of the symptoms can be more or less

overcome because of its antacid, protective, and antispasmodic or relaxant effect on the sphincter pylori. In addition it not only acts as a drug alleviating those symptoms, but also as a food and laxative, which factors not infrequently demand our attention.

Again, olive oil is devoid of the numerous contraindications encountered in drugs used to overcome these symptoms.

Since gastric ulcer is the symptomatic expression of pyloric spasm, hyperacidity, and dilatation, and is the result of increased hydrochloric acid on a less resistant gastric area, no other drug or drugs can fulfil all the indications in the treatment of this disease except olive oil. Its action is purely local, and is altogether devoid of the cumulative effects characteristic of certain drugs used in treatment of this disease. Pyloric spasm, its significance and the rôle it plays in gastric symptomatology, Asnis fears is not thoroughly appreciated. It is a symptom or condition met with in several diseases of the stomach and is due to some irritant, whether local or general, and not infrequently dilatation of the stomach may be a result of persistent and prolonged pyloric spasm.

In the vast majority of instances the causative factor is of local nature, and the use of olive oil is far more desirable than any known antispasmodic.

To mention olive oil in the treatment of gall-stones, especially in the presence of surgeons, is to tread on dangerous ground and to invite trouble; however, Asnis will venture to explain the action of this drug, and the grounds upon which claims for its use in certain cases are justified.

The mere mention of olive oil in the treatment of gall-stones, almost with no exception, is met with a sneer of ridicule. Part of this, Asnis admits, is well deserved. The extravagant claims by well-meaning physicians and the ridiculous claims by quacks and imposters are certainly responsible for the undeserved abuse, but aside from that there is a plausible physiologic explanation for the possible benefit of its use in gall-stones.

The clinical symptom of gall-stones and colic is pain. The pain is due to the distention of the gall-bladder consequent on the impaction of the stone in the neck or duct of the gall-bladder, and is also caused by the irritation and consequent contraction of the impacted area on the gall-stone.

The use of large doses of olive oil in preference to morphine is justifiable on the following physiologic explanation: As soon as the oil enters the duodenum it splits up into glycerin and fatty acids. Part of the glycerin acts locally, reducing turgescence of the biliary duct. Part of the glycerin is absorbed and reaches the liver, and here acts as a direct stimulant, producing an abundant flow of watery bile which may wash and carry small stones through the duct. When the stones are larger, the local action of the glycerin, acting in the presence of large quantities of bile, causes a change of position of the stone, and a free passage is opened for the flow of this watery bile, thereby removing the impacted stone from its surgical position, and relieving the tension of the gall-bladder.

Rutherford, of the medical department of the U. S. Army, who had under his charge a large number of cases of diarrheas and dysentery contracted by soldiers in the Philippines and treated at the U. S. Army Hospital at San Francisco, makes the following statement: (1) Olive oil increases the flow of watery bile. (2) The liquid bile acts as an intestinal antiseptic, promotes absorption of fat and acts as a local sedative, reduces putrefaction and fermentation, and there is a general gain in weight and strength of the patient.

THE TREATMENT OF BICHLORIDE OF MERCURY POISONING.

The *Ohio State Medical Journal* of September 1, 1917, contains an article by WEISS on this topic. He points out that, locally, mercury produces necrosis and sloughing of the tissues. Internally, practically every organ is affected; the liver, colon, and kidneys are injured the most. At first there is produced cloudy swelling, leading to fatty degeneration and necrosis, very frequently

to hemorrhagic changes, and subsequently to calcification.

Flexner and Sweet have demonstrated that mercury absorbed by the gastrointestinal tract is taken up by the liver, secreted by the bile, and then reabsorbed by the liver from the intestines. Rosenbloom found that almost one-third of the mercury obtained from the body of a suicide was obtained from the blood. Burmeister and McNally have found mercury in the blood of dogs ten minutes after small doses of mercury were introduced into the stomach. They found that the kidney changes varied with the size of the dose in massive intoxication and that liver changes varied as the duration of the intoxication.

Commencing with burns from local application, the symptoms produced are classical. Vomiting, gastric and intestinal hemorrhages, blood, pus and casts in the urine, oliguria or anuria, anasarca, follow rapidly in uncontrolled cases. As the condition progresses, the patient may enter into a state of muttering delirium, coma, convulsions, and finally death.

To determine whether a patient has actually introduced mercury into the system, Weiss has used the method described by Vogel and Lee for the detection of the metal in the secretions and excretions. This is a simple and accurate method by which one can detect mercury in the proportion of 1:100,000.

The following methods of treatment are among those reported:

Shisler uses 30 to 60 grains of magnesium oxide three-hourly with large amounts of water. If edema has developed, the quantity of water is reduced. Anderson advises hydraulic irrigation through a cecostomy wound in the effort to hasten elimination through the intestine. Wilms uses calcium sulphide by mouth and intravenously. He maintains that calcium sulphide is the chemical antidote for bichloride of mercury.

Previously patients have been treated symptomatically, by giving large amounts of water, water restriction, hot packs, hypodermoclysis, and proctoclysis.

Lambert and Patterson have the most successful report on the treatment of bichloride of mercury poisoning. In a series of 16 cases they report but two deaths. Their treatment consists in giving the patient large amounts of fluid by mouth; 8 ounces of milk two-hourly alternated with 8 ounces of the following mixture two-hourly:

Potassium bitartrate, 4 grammes.
Sugar, 4 grammes.
Lactose, 15 grammes.
Lemon juice, 1 ounce to water 16 ounces (480 Cc.).

Together with the large quantity of fluids given by mouth, they give a solution containing 1 drachm of potassium acetate to the pint of water continuously by rectum. They also wash the stomach twice daily and give two colonic irrigations twice a day. A daily hot pack is added.

After an experimental study on rabbits, Burmeister suggests the use of copious venesection, to be followed by transfusion of normal blood.

Patients poisoned with mercury die with all the symptoms of acute nephritis. The evidences that we get of acute nephritis are merely an indication of what is going on throughout the body. Just as the kidneys undergo cloudy swelling, so are the other tissues swollen to a more or less extent. When albumin, blood, and casts are found in the urine, we may be reasonably sure that the other organs have undergone similar changes—*i.e.*, severe, cloudy swelling. Oliguria or anuria develops, and associated with either many of the symptoms appear as nausea, vomiting, and headache, probably depending upon the edema of the brain.

Weiss has used this principle of colloidal swelling, described by Fischer, as the basis for his treatment. He gives alkalies, hypertonic salts by mouth, by rectum, and intravenously. He has used a pleasant alkaline drink, modified from the old English potus imperialis, which consists of:

Cream of tartar, 4 grammes.
Sodium citrate, 2 grammes.
Sugar, 2 grammes.
With lemon or orange juice to tase, to 8 ounces of water.

This drink is best made by placing the cream of tartar and sodium citrate into the

lemonade just before using. In conjunction with this Weiss uses the intravenous injection of Fischer's solution, which is

Sodium carbonate (cryst.), 10 grammes.
Sodium chloride, 15 grammes.
To 1000 Cc. of water.

The treatment commences by washing the stomach with the whites of three eggs and one quart of milk, followed by water until the stomach is emptied. Before the stomach tube is removed 3 ounces of magnesium sulphate with 6 ounces of water is introduced and allowed to remain in the stomach. The patient is then given a soapsuds enema.

If the patient did not vomit shortly after taking the poison and did not reach medical aid for at least three hours later, an intravenous injection of Fischer's solution is given at once. Usually over 1000 Cc. are introduced into the system. Weiss has given as high as 2000 Cc. of the solution without any disturbance to the patient. Then the patient is given eight glasses of "imperial drink" a day and large quantities of water by mouth. He is allowed a liberal diet, almost anything except an excess of protein foods.

Weiss uses the analysis of the urine as a control of the treatment. The patient should void large quantities of urine as he is taking large amounts of fluid. He endeavors to keep the urine alkaline to a saturated solution of methyl red in alcohol, for Fischer has shown that if the urine of a nephritic cannot be made alkaline to methyl red, this patient continues in a dangerous state. An animal poisoned with mercury is at least a potential if not an actual nephritic. Almost all of the patients develop an albuminuria early, but this gradually, or occasionally rapidly, disappears as soon as sufficient alkali can be introduced into the body to counteract the abnormal amount of acids produced.

Weiss has had complications only in one patient. He developed a severe necrosis of the mucous membrane of both sides of the cheek, and later in the course of the disease he had severe intestinal hemorrhages, in all probability from the colitis produced by the mercury excreted through the bowel. Similar cases were described by Lambert and Patterson.

ARTIFICIAL PNEUMOTHORAX AND ITS VALUE IN THE TREATMENT OF PULMONARY TUBERCULOSIS.

CROCKET in the *Glasgow Medical Journal* for August, 1917, states he has given nearly 700 injections, and only on one or two occasions has he had cause for anxiety. The first occurred about an hour after the injection. The patient became very cyanosed; the pulse weak and rapid; the temperature, from being normal, rose to 102.5°. There was some respiratory distress. The urine, normal previously, showed the diazo and the Moritz Weiss reactions. There was some pain on the side where the injections had been given. Stimulants were given, and fomentations applied, and the patient came all right. A few days afterward Crocket found the filters soaking, and thought it might have been due to some antiseptic fluid being passed over from the cylinder when the injection was nearly finished. He at that time used mercury bichloride in the water.

In the second case, 1700 Cc. of air had been injected for the purpose of checking a hemoptysis, which had resisted every other form of treatment. The patient did not complain at all during or immediately after the operation, but half an hour later, probably on account of the gas expanding, as it became heated in the chest cavity to the temperature of the body, and therefore a gradually increasing pressure resulting, the heart became seriously embarrassed. The patient became very cyanosed and gray. Her extremities were cold, the pulse was not perceptible at the wrist, and the breathing was very rapid. A needle was rapidly inserted into the pleural cavity and decompression followed. Strychnine was injected and fomentations applied, and the foot of the bed raised. The patient did well, and at the present time is in very good health.

In several cases a pleural effusion has

resulted. Occasionally it has been a very small amount, and only discovered fortuitously by *x*-ray examination. Crocket has found this at no time to be a serious complication. It is a very rare thing for this effusion to be transformed into an empyema, although tubercle bacilli can generally be found in the fluid by inoculation. All his cases that developed this complication did very well. In two cases, after the effusion, Crocket ceased the induction of pneumothorax. The fluid acted as a splint, and further injections of gas were not required. In several cases he has withdrawn a little of the fluid, and at the same time injected more gas. This procedure seemed to aid the absorption of the fluid.

It is absolutely essential before beginning this treatment to obtain the consent and hearty coöperation of the patient. Without these the attempt to induce a pneumothorax should not be made. The treatment is one that may occupy not only many months but several years, and one may have to wait till six or eight injections have been given before definite indications of real improvement manifest themselves. It is interesting to note that one of the striking things that is observed, as the patient begins to improve, is the disappearance of tubercle bacilli from the sputum after repeated examination. Crocket has had a large number of cases which previous to injection showed always numerous tubercle bacilli in the sputum, and shortly afterwards failed to show any. Saugman, it may be stated, noticed that in 50 per cent of his cases. One does not always notice an immediate increase of weight in those patients who are doing well. One patient gained over a stone. Several, however, remained stationary. In one case the weight fell. In this instance the patient had been gradually increasing in weight, although the lung disease was extending and becoming more active. She improved very much ultimately as a result of the treatment.

The reason why artificial pneumothorax should be so very helpful is uncertain. The probability is that the collapse of the lung and the continued pressure on it by the air injected has the effect of resting the diseased part, and allowing the lesions to heal by cicatrization, while the other lung, for the time at least, is in a condition of hyperemia which helps in its recovery should it also be affected with the disease, as it almost invariably is.

There is no doubt that in this method of treatment physicians have a means of benefiting a class of patients that previously no power on earth could help. Unfortunately the percentage of unilateral cases that are really ill enough to submit to a prolonged and troublesome course of treatment is small, and these, too, often defer their consent to what they consider a drastic measure till it is too late. From personal experience, Crocket is convinced that if attempted before the disease has become disseminated too widely, and before the toxemia has reduced the general condition too low, and if carried on for an indefinite period, many lives, otherwise hopeless, would be saved.

STUDIES UPON THE COMMON HOUSE-FLY.

In the *Journal of Medical Research* for September, 1917, Scott from an investigation gives his conclusions as follows:

1. The common house-fly may carry pathogenic bacteria upon the surface of the body, legs, wings, and proboscides, mechanically, or it may carry infectious organisms in the intestinal tract and deposit them on foodstuffs, either in the "vomit spots" or in fecal deposits.

2. The bacterial flora carried by the house-fly varies directly with the sanitation of the area in which the fly is captured, the most heavily polluted flies coming from the slum districts.

3. House-flies show seasonal variation in the number of bacteria carried as well as in the species of bacteria. The seasonal variation shows the greatest bacterial flora is coincident with the summer months, and the occurrence of intestinal complaints of summer and early autumn.

4. The isolation of members of the colon-typhoid-dysentery group of bacilli from numbers of flies indicates that the house-fly

has the power of carrying the closely allied pathogens, typhoid and dysentery.

5. The finding of virulent pyogenic cocci indicates the possibility of the common house-fly being a factor in the dissemination of the suppurative processes.

6. The results of Scott's experiments indicate that typhoid fever in the District of Columbia, under normal conditions, is not referable to the house-fly.

7. The heavy bacterial flora and the presence of the intestinal group of bacteria on the house-fly presents a potent argument for the protection of foodstuffs from the access of flies, and furnishes a strong plea for the abolition of the breeding places of *Musca domestica.*

MASSAGE AND EXERCISE IN THE AFTER-CARE OF POLIOMYELITIS.

BERG well points out in the *Medical Record* of August 25, 1917, that the treatment of poliomyelitis and the ultimate restoration of function, after the disease has passed the acute stage, depend in large measure upon the special skill and judgment with which exercises and massage movements are administered to the paralyzed parts. The cases presented here are cited to illustrate what it is possible to accomplish by means of scientific massage and body movements administered in coöperation with the medical care of the patient.

Case 1.—A little girl, eighteen months old, living in a town suburban to New York, whose distress had been witnessed by physicians of the metropolis and community where she lived, was regarded as the most serious case of infantile paralysis that had come under their observation. She had been stricken with the disease at the age of eight months, and was in a pitiful condition when in the summer of 1914 Berg began his treatment, she being so delicate that it was extremely difficult to handle her. She was lying on her back in braces which covered her body completely from the feet up to the shoulders; the arms and hands were also imprisoned. She was lying in these armor-like enclosures twenty-three hours of the day, and could do little more than move one arm. Her back was as weak as that of a new-born child. The abdominal muscles were also weak. The neck muscles were contracted so that the shoulders were drawn up to the ears, making the chest narrow and sunken. The levator scapulæ was paralyzed on the right side, and both deltoid muscles were paralyzed. The arms were partially deprived of function. She could move the right forearm slightly. The shoulder and arm muscles were atrophied. The left arm had so great a pronation contraction that the palm of the hand was turned upward. The right hand had a palmar contraction. Both legs and feet were paralyzed; the legs were rotated outward. The gluteus maximus on the right side was atrophied, giving this part of the body a concave rather than a convex outline. The left knee had a flexion contraction, the left foot so great a supination contraction that the sole was directed upward. The right foot had a great plantar contraction, so that it looked like a clenched fist, and there was a marked contraction of the tendo Achillis.

Berg treated her for about three months, six days a week, during her summer stay at her home. After her return to New York she had occasion to treat her only two or three times a week for a little while, then leaving her to the care of her mother, to whom she had taught a few exercises and light massage movements for the case.

When Berg left her little patient her back was sufficiently strong to enable her to sit up by her own strength; she could bend her head down to her feet, turn over, and move both her forearms and hands, and play with her toys. The contraction of the neck had disappeared and the chest was nicely developed. All the other contractions were greatly bettered, as was also the condition of the abdominal muscles. She could move her legs and feet a little and keep her legs together when placed in the right position. The atrophied gluteus muscle had developed to normal size, and the arm and shoulder muscles had improved a great deal. The general condition of health was excellent.

The parents will now arrange to have the child stay for a longer time in New York and continue the treatment. Berg has already worked with her one month. When lying on her back with flexed knees and resting on her neck and the soles of her feet, she can now easily raise her body to the highest degree possible in that position. Her feet are so well developed that it is possible for her to maintain the above-mentioned position, lying on her back. She can rotate the legs inward and outward, abduct and adduct them a little, can raise her arms above her head and lower them again, can lift her right arm in its whole length and swing it over to the left side. She can move her left forearm in all directions. The contraction in the left arm has not yet been conquered, but she can without aid pose her hand and keep it in the right position. The other hand is normal. The contraction of the knee is much improved. When lying on her abdomen she can raise her back as high as it is normally possible when resting on the forearms; she can bend and stretch the right knee; the left leg is weaker, but it is probable that in a short time she will be able to do the same movement with that member.

Infantile paralysis leaves its victims more or less crippled and the inactivity of the patient, caused by the paralyzed parts of the body, hampers improvement. Therefore the first essential is to work up the general circulation by means of breathing exercises, so that the lungs may be filled with fresh air and the stationary air be expelled. This is done by drawing the arms of the patient upward when lying on the back, and moving them slowly downward again under as much voluntary inhalation and exhalation as the patient is able to command. This exercise expands the chest, stretches the spine, and works beneficially upon the muscles of the abdomen. Thereafter spinal treatment should be given before administering local treatment. One must, in an artificial manner, try to produce the same effect for the patient as a healthy person gets from his daily movements.

The exercises, as well as all the massage movements, must be very carefully done and always specifically with the needs and condition of the patient in view, for otherwise harm rather than good may be done. One must bear in mind this purpose—to build up affected limbs and to improve the general health. A rule in the science of mechanotherapeutics is that it is better to do too little than to do too much. It is, of course, understood that the massage exercises must be highly developed and scientifically applied, in order to be able to restore the function which infantile paralysis has destroyed in its victims. The hand and wrist of the practitioner of massage must be trained somewhat like those of a pianist for acquiring the soft, gentle, and yet strong grasp which is necessary for obtaining good results.

Scientific massage can give results in infantile paralysis cases that are equaled by no other treatment. It improves the nervous system and the circulation of the blood, principal factors for improving paralyzed limbs, atrophied muscles, and weak joints. Together with the technique of massage go the exercises designed for each particular case, first passive ones that are replaced later by active, free or resisted, exercises when the patient is able to perform them—in concentric and eccentric form as the muscles may be affected, contracted or elongated.

THE TREATMENT WITH BACTERIAL VACCINES OF BRONCHIAL ASTHMATICS WHO ARE NOT SENSITIVE TO PROTEINS.

WALKER reports on this subject in the *Journal of Medical Research* for September, 1917, as follows:

Occasionally the serum of non-sensitive patients with bronchial asthma agglutinates strains of S. pyogenes aureus; in such cases treatment with vaccines of this organism should be given and relief from asthmatic attacks usually results.

Occasionally attacks of bronchial asthma are relieved by treatment with diphtheria vaccines; in this study one patient in six was relieved by such vaccines.

Attacks of bronchial asthma, or at least symptoms which resemble those of bronchial asthma, may be associated with conditions or diseases which are quite remote from bronchial asthma. It is quite possible that so-called bronchial asthma in patients who are sensitive to protein is not true bronchial asthma; it is evident that cardiac, renal, pulmonary, and pituitary disease all may cause symptoms which simulate bronchial asthma.

RESUSCITATION OF THE NEW-BORN INFANT BY HEART MASSAGE.

FISHER writes to the *British Medical Journal* of August 18, 1917, that although he has had some experience in midwifery, having attended over 2200 cases in thirty-five years, he has not before this come across an instance in which he has been able to revive a child when the heart impulse had ceased.

The labor was one in which the head was delayed by a very deep perineum in a primipara. Chloroform was used and delivery completed by forceps, the perineum being torn to the anal margin. No time was lost in abstracting the child. The child was more white than blue. Artificial respiration was of no use even after blood had been allowed to flow from the cord.

Fisher had read lately of a successful case of heart massage performed in an operating theater by incising the epigastrium and massaging through the diaphragm, and as there was not any heart-beat at all, he tried massage.

He pressed his right fingers deeply into the left epigastric region, and pushed them right under the ribs, invaginating the belly wall, the left fingers pressed into the chest about the left nipple, and he was able to grasp the heart. He tried to make his two sets of fingers meet by repeated quick thrusts, and after five or six the heart started beating. In about one or two minutes it was fairly established, and then ordinary artificial respiration caused the child to breathe in about five minutes; keeping it up Fisher got a good cry before ten minutes had gone by. The child never had a throwback afterwards, but bruising showed itself where his fingers had pressed in the skin.

As a rule, one finds a heart-beat in these cases, and continues artificial respiration as long as a heart flutter can be detected. Hitherto, if that heart flutter had ceased, one has considered that no more can be done. Now Fisher is convinced that heart massage as described will most probably set the heart going again, and then artificial respiration will complete the process.

Whether the cardiac stoppage was due to the chloroform Fisher cannot say. Certainly the mother did not have an overdose, as she was sufficiently "round" to implore him to save her child.

ACETOZONE AS A GENERAL SURGICAL ANTISEPTIC.

In the *British Medical Journal* of August 18, 1917, GORE-GILLON states that the important properties of an ideal antiseptic appear to be (*vide* Browning and others, *British Medical Journal,* Jan. 20, 1917) that it has (1) great potency against all micro-organisms in presence of protein material, as serum, etc.; (2) no deleterious effect on phagocytosis; (3) is innocuous to the tissues; (4) has a stimulating effect on connective tissue cells, so that it promotes healthy granulations; and is not toxic.

In benzoyl-acetyl-peroxide we have a preparation that fulfils these conditions. After previous experience of this substance in his surgical wards, Gore-Gillon introduced it into England in May, 1915, and has used it extensively in military hospitals since then as an antiseptic solution in the treatment of wounds. It has been used for years as an intestinal antiseptic in enteric fever and mucous colitis, and as a throat spray.

It may be used cold as a bath: (*a*) containing 5 grains to the pint (the cost is 8d. a gallon at army prices, and plenty of it is available); (*b*) or as a 7-grain solution with one-third hot water added. Its action is very rapid; unhealed amputation stumps

heal quickly if put into a bath of this solution for half an hour daily, and afterward dressed with sterile lint or gauze soaked in the 10-grain solution.

Gore-Gillon has seen numerous cases of septic wounds which have resisted all other treatment of four or five months heal up in three weeks by this method.

It can be applied to deep wounds by Carrel-Dakin tubes, by the bath method, or in a water-proof bag, or by wet dressings of 10-grain-strength solution, renewed two or three times a day.

1. The solution must be made by adding 5 to 7 grains to 1 pint sterile water at 112° F., left to stand for two hours, and *should not be filtered.*

2. Or a 10-grain-to-1-pint solution can be used with dressings or Carrel-Dakin tubes, etc.

3. The solution should be *made fresh every seven days,* and the bottle shaken before using.

Pure hydrogen peroxide is very unstable and momentary in its oxidizing power, while acetozone in solution is a fairly stable antiseptic, and its ozone-producing power is prolonged. Acetozone has a remarkably pleasant, pungent, ozonic odor; the solution is colorless and does not stain linen.

A STUDY OF VENEREAL PROPHYLAXIS IN THE NAVY.

RIGGS of the U. S. Navy Medical Corps writes as follows:

By artificial prophylaxis is meant those artificial means that may be used to prevent infection resulting from exposure. The so-called army and navy type of medical prophylaxis is used at the Norfolk station, when men who admit exposure return from liberty. A record was taken of 6746 treatments, of which 127, or 1.88 per cent, turned out to be ineffectual. In a record of one regiment on the Mexican border covering a period of 29 weeks Exner found the failures of the treatments as used there to amount to 1.4 per cent. The treatment is remarkably effective, and, if used within a short time subsequent to exposure, it is practically infallible. With a view of determining the efficiency of this medical prophylaxis for each hour elapsing after exposure, every applicant for treatment at the station was required to state how many hours had passed since he had been exposed to infection. Considerable care was taken in recording these figures, and there is now available for examination a history of 5103 treatments concerning which the time of treatment subsequent to exposure is known. Eighty-one, or 1.58 per cent, were ineffective. The following table gives the number of treatments during each hour subsequent to exposure and the number who later developed a disease on account of that exposure:

Number of treatments, failures, and percentages for each hour after exposure.

Hours subsequent to exposure.	Number of treatments.	Number of infections.	Per cent of infections.
1	1180	1	0.08
2	1172	7	0.59
3	521	4	0.77
4	330	2	0.61
5	199	3	1.57
6	321	5	1.58
7	277	6	2.27
8	390	16	4.22
9	283	10	3.62
10	214	11	5.14
More than 10	216	16	7.40
Total.....	5103	81	1.58

There were 1180 treatments during the first hour which were followed by a single infection. This infection was carefully investigated, and there is considerable doubt as to whether it was genuine or not. The disease was diagnosed as chancroid and was cured in two days.

The above table is a remarkable testimonial as to the efficiency of medical prophylactic treatment in particular, if administered within a few hours subsequent to exposure to infection. As Dr. R. A. Bachmann states: "It is an almost overwhelming fact . . . . that if every illicit or dangerous intercourse were followed by a reliable prophylactic, in a few years we should witness the passing of the scourge as complete as the eradication of yellow fever, bubonic plague, and malaria."

Some have maintained that this treatment in the end does more harm than good

in that it gives a false sense of security, and thereby the restraining factor of fear of disease is done away with. Riggs does not believe that there is any truth in this, for during the past two years he has questioned hundreds of individuals as to why they permitted themselves to be exposed to infection, and he has yet to hear one say, "I didn't think there was any danger if I took the prophylactic."

Furthermore, he has asked a number of experienced medical officers if they had ever heard such or a similar reason given as an excuse for sexual incontinence, and all have replied that they had not. If it is a fact that a knowledge of the protective value of medical prophylaxis does not tend to increase illicit sexual intercourse, then the argument of those who are against this form of prevention on the grounds of morality is without support. Of course it might be held that a venereal infection is the proper and natural punishment for one who offends sexually, but this does not seem reasonable. Nor does it seem good morals to hold that because the individual has already taken one false step he shall be denied artificial assistance to save him from the further horrible consequences of a venereal disease. Accordingly, it appears that if we deliberately neglect to use this valuable branch of prevention we are actually guilty of encouraging the spread of venereal disease.

There are no statistics from which we may deduce the normal percentage of venereal infections that may be expected to follow illicit intercourse when prophylactic means are not employed. In the above table those who took prophylaxis later than ten hours after exposure give a rate of infection of 7.4 per cent, and applying this percentage to the 6746 recorded exposures gives an expectancy of 499 venereal infections. As a matter of fact, there were only 127 subsequent infections, so that it may be assumed that the difference, 372, represents the least number of venereal infections which were prevented by the 6746 treatments. It is unlikely that the venereal situation in this community would have been better had the 6746 prophylactic treatments been withheld and these 372 venereal infections been permitted to take place.—*The American Social Hygiene Association,* No. 100.

VACCINE TREATMENT OF WHOOPING-COUGH.

BLOOM in the *New Orleans Medical* and *Surgical Journal* for September, 1917, makes a long report on this subject and concludes that:

1. The treatment of pertussis (whooping-cough) by vaccine therapy is rational and efficient.

2. Experience has taught that large initial (500,000,000 to 1000,000,000) with subsequent large doses are fruitful of better and quicker results than smaller ones.

3. Vaccine therapy has proven the better treatment because of

(*a*) Slight reaction.

(*b*) Duration average only 24 days.

(*c*) The loss of weight is unappreciable, 9½ ounces.

(*d*) The intensity and number of coughing spells become less after seven days.

(*e*) Vomiting ceases after one or two weeks.

(*f*) No complications in forty cases, the first series now exceeding twelve months' duration.

(*g*) Mortality is 0 per cent.

4. The vaccine should be used extensively as a prophylactic means as it has reduced institutional whooping-cough from 40 to 7 per cent.

KEEP SENILE CASES OUT OF BED.

In the *Medical Review of Reviews* for September, 1917, THEWLIS gives the following rules:

1. "Keep senile cases out of bed" may be applied to almost every senile disease.

2. Aged patients fail more rapidly in bed and may develop pneumonia, renal or intestinal toxemia. Kidneys become insufficient in many senile cases as a result of remaining in bed.

3. It gives the old person courage to

fight his battle and takes the death-warrant, "old age," away from him to allow him out of bed.

4. After a surgical operation the aged person should get out of bed the next day.

5. Senile cases do not do well in bed.

THE IMMEDIATE EFFECT OF CIGARETTE SMOKING ON HEALTHY MEN AND ON CASES OF "SOLDIER'S HEART."

In the *Lancet* of August 18, 1917, PARKINSON and KOEFOD make a report from studies on inhalers and non-inhalers. They state that:

1. The immediate effect of cigarette smoking upon the circulatory system and upon the breathlessness of exertion was observed in 30 smokers, of whom 20 were cases of "soldier's heart" and 10 were healthy soldiers. Each subject smoked either four or five cigarettes during a period of forty minutes.

2. A demonstrable effect was recorded in 17 of the 20 patients; the three unaffected were non-inhalers. Nine of the ten controls, all inhalers, were influenced in the same fashion, though not to the same degree.

3. The average pulse-rate among the patients during smoking was nine beats higher than before smoking; in the healthy controls it was six higher. Initial slowing of the heart was never observed, nor any irregularity referable to smoking.

4. The rate of respiration in the patients was unaffected; in the controls it was slightly reduced.

5. The average systolic blood-pressure was raised by 5 to 10 mm. Hg and the diastolic by 5 mm., both in patients and controls.

6. These effects appeared within five minutes; with the first cigarette they almost reached the maximum, and this was maintained throughout the smoking period.

7. A simple exertion test was performed before smoking and repeated on its cessation. In the patients the pulse-rate maintained a higher level throughout the test *after* smoking, and half of them were more breathless both subjectively and objectively. In two patients precordial pain was induced by smoking, apart from exertion. But in the controls the pulse-rate curve during exertion was much the same after smoking as before, and breathlessness was induced in two only.

8. These observations show that, in health, the smoking of a single cigarette usually raises the pulse-rate and blood-pressure perceptibly; and these effects are a little more pronounced in cases of "soldier's heart." Moreover, the smoking of a few cigarettes can render healthy men more breathless on exertion, and manifestly does so in a large proportion of these patients.

9. Excessive cigarette smoking is not the essential cause in most cases of "soldier's heart"; but, in the opinion of the writers, it is an important contributory factor in the breathlessness and precordial pain of many of them.

A REPORT OF A GROUP OF ONE HUNDRED AND TEN CASES OF POLIOMYELITIS.

The *Journal of the American Medical Association* of September 1, 1917, contains an article bearing this title. It concludes as follows:

1. A reliable early diagnosis can be made in a large majority of the cases.

2. He is unable to prognosticate regarding the subsequent severity of the paralysis, either by the acuteness of the febrile stage or any laboratory findings thus far submitted.

3. When death occurs, it takes place with few exceptions during the first few days following the acute onset.

4. Treatment outdoors during the convalescent stage is most beneficial.

5. In Ogilvy's experience, immunized serum treatment has not proved efficient.

6. Although there is nothing to disprove the possibility of an insect carrier, the evidence submitted would sustain the assumption that poliomyelitis is a contagious disease.

7. Although muscle testing by balance weight is applicable in only a small per-

centage of the patients, in these patients it is of much value.

8. Continuous supervision is most important.

9. Continued electrical treatment is not essential for the recovery of lost muscle function.

10. Bath exercises in relation to muscle training form one of the most practical and useful lines of treatment that can be followed out.

11. Complete rest extending over six months is one of the most important factors in obtaining perfect return of function.

12. Overfatigue is of the greatest detriment to improvement, and is most difficult to guard against.

13. Braces should be made as light as possible and should be supplied immediately when body weight-bearing tends to produce strain or deformity.

14. The percentage of paralyzed and non-paralyzed patients in an epidemic may be expected to be about 58 per cent paralyzed, 42 per cent non-paralyzed; or, excluding those who died, 49 per cent paralyzed, and 51 per cent non-paralyzed.

PRACTICAL POINTS IN THE USE OF STROPHANTHUS.

CORNWALL in the *Medical Record* of September 15, 1917, writes enthusiastically of the use of strophanthus and says in chronic valvular disease with decompensation of considerable degree, requiring direct heart stimulation, he gives strophanthus tincture in doses of two or three minims every four hours, or strophanthin, 1/1000 grain hypodermically, every four hours. In extreme decompensation in mitral stenosis, with auricular fibrillation, strophanthin is given hypodermically, every four hours, in doses of 1/500 grain, or even 1/250 grain, and usually morphine sulphate in combination with it in doses sufficient to alleviate the dyspnea and restlessness. This combination of strophanthin and morphine has given Cornwall the best results which he has been able to obtain in this class of cases. After securing compensation, which is often fragile, it may be necessary to keep up the administration of strophanthus in reduced doses, and sometimes of the morphine also. Strophanthin usually causes so much local irritation when given hypodermically that its use is forbidden.

In conditions of chronic myocardial degeneration with loss of compensation, strophanthus is employed when strychnine is not sufficient. Ambulant cases are given one or two minims of the tincture every four hours, and cases confined to bed one to three minims every four hours. In the severe cases strophanthin is given alone or with morphine, in the manner before described. The superiority of strophanthus over digitalis nowhere appears more clearly than in the treatment of advanced chronic myocardial degeneration.

The author desires to emphasize this point in the use of strophanthus: that it should be used in the right doses, which, except when used for emergencies, or after establishment of tolerance, seem to be much smaller than those which have been generally recommended; for it is only by using it in the right doses that the best results can be obtained. There is reason to suspect that when given in excessive doses, especially if long continued, it can injure the heart, perhaps more than digitalis does.

REPORT OF RESULTS OF RADIUM TREATMENT BY THE CANCER COMMISSION OF HARVARD UNIVERSITY.

In the *Boston Medical and Surgical Journal* of Sept. 13, 1917, DUANE and GREENOUGH make a long report on this subject and state that as a result of the use of about 235 milligrammes radium in the treatment of 642 cases of cancer and allied conditions at the Collis P. Huntington Memorial Hospital, from September, 1913, to January, 1916, the following conclusions are justified:

1. Many cases of advanced, inoperable, or recurrent cancer may be given benefit by treatment with radium.

2. In such cases the relief may include one or more of the following advantages:

Relief of pain, diminution of discharge, rendering discharges less offensive, relief of hemorrhage, diminution in the size of tumor masses, even to their total disappearance, and the improvement in the general condition of the patient. To these must be added the undoubtedly beneficial psychic effect upon the patient.

3. In a very small number of advanced and apparently inoperable cases, improvement may occur such as to permit a radical operation to be performed.

4. In a certain proportion of cases of superficial non-metastasizing types of cancer (about 35 per cent), and in a much smaller number of cases of metastasizing cancer, radium is capable of destroying the clinical manifestations of the disease. Time has not elapsed sufficiently to report these cases as "cured," and they are being kept under observation. In a limited number of cases, recurrence, after apparent destruction of the lesion, has taken place. In certain situations, as on the eyelids, radium treatment of these lesions is to be preferred to operation.

5. In keratoses, papilloma, and other benign skin diseases regarded as "precancerous," radium is effective in destroying the clinical manifestations of the disease in from 48 to 60 per cent of cases.

6. In myelogenous leukemia, the beneficial effects of radium are pronounced, and although recurrence of symptoms may take place, the clinical advantages of radium therapy are very marked.

7. In malignant lymphoma, lymphosarcoma, and Hodgkin's disease, the lesions appear to be especially sensitive to radiation, and definite, though temporary, benefit is obtained. When in accessible situations, it would appear that the disease could be controlled by radiation for a considerable period of time.

8. In the treatment of many other tumors and diseases radium has been used with benefit, depending largely upon the extent of the disease, its depth in the tissues, and the practical ability to apply sufficient radiation to modify or destroy tissue or tumor growth. Among the conditions in which radium treatment has proved of especial value may be mentioned: recurrent or inoperable carcinoma of the cervix, or of the body of the uterus, Hodgkin's disease and malignant lymphoma, myelogenous leukemia, inoperable squamous-cell carcinoma of the tongue, jaw, and buccal mucous membranes, in non-metastasizing epidermoid cancer, and in the more benign lesions of keratoses, papilloma, and other so-called precancerous conditions.

9. Radium therapy has proved, so far, to be of little benefit in recurrent carcinoma of the breast, carcinoma of the stomach and intestine, carcinoma of the glands of the neck, by extension from cancer of the tongue, mouth, and lip, and in general in deeply seated metastatic extension of cancer from any region.

10. The use of radium in prophylaxis of recurrence after radical operation, for the cure of cancer, is not advised. Where serious doubt exists as to the complete removal of the primary tumor, and where the location of the suspicious area is superficial and accessible, and of small extent, radium may be used with benefit, but where a large area is to be considered, as after operation for breast cancer, the difficulties of covering the whole area with sufficient radiation are such that the treatment is not to be recommended.

11. The combination of radium therapy and operation, by which a tumor, otherwise inoperable, is excised as thoroughly as possible, the remaining tissues cauterized, and subsequently subjected to radiation, has yielded satisfactory results in several cases. This method of procedure is especially adapted to the more advanced cases of rodent ulcer involving the face. After a period of radiation and observation of the open, granulating wound, extending over several months, secondary plastic operations have been performed to close the defects, and the results up to the present time, in a very small number of cases, have shown no return of the disease.

12. Of 642 cases treated with radium in this series, 354, or 55 per cent, received definite benefit.

13. Although many cases of advanced carcinoma show no appreciable benefit from radium treatment, it is also true that in no case yet observed has radium appeared actually to accelerate the growth of tumor tissue. Patients have suffered pain and inconvenience from the effects of radium burns in certain instances, but these have been of a temporary character. The constitutional effects of heavy doses of radium are unpleasant, and severe nausea and depression may occur; but these, also, are chiefly temporary in character. With continued and excessive dosage, very profound constitutional effects may be obtained. A serious diminution in the number of white cells in the blood is observed after continued heavy dosage. This is a more lasting phenomenon, and may be of serious importance in relation to the patient's resistance to infection. On this subject the authors are not as yet ready to report. In no other respects have they found radium to exert an unfavorable action upon the patient.

14. The considerable expense of purchase and the difficulties and dangers of administration of radium therapy are more than justified by the results obtained.

PERSISTENT TREATMENT OF EPILEPSY.

In the *Journal of the American Medical Association* of September 15, 1917, PERSHING pleads for persistent treatment. He believes the diet of the epileptic should be generous and varied, and he should learn to moderate his desire for excessive quantities of food. The big holiday dinner is especially dangerous. A written list of articles permitted and prohibited should be given. Those permitted should include the ordinary fresh meats, poultry, fish, eggs, cooked vegetables, cooked fruits, wheat bread, light cakes, tea and coffee.

In the list of prohibited things should be included oatmeal, corn-meal, bran bread, popcorn, hominy, most breakfast porridges, and, in general, the bulky foods that are so much recommended as laxatives. These foods are laxatives because they mechanically irritate the intestine and thus indirectly irritate a sensitive skin or a sensitive nervous system. Moreover, they generally contain the wrong kind of protein and a great excess of starch. Nuts are especially harmful and should be absolutely prohibited. Salt is to be restricted to a small amount; therefore salt meats are to be avoided. Certain raw fruits, especially apples and bananas, are dangerous. Pastry, heavy puddings, very rich dishes, and unusual mixtures must be avoided. Alcohol and tobacco are not for the epileptic.

In giving bromide the aim, of course, is to find such a dose, so combined with other remedies, that attacks will be prevented and yet the patient not seriously suffer from its prolonged administration. Pershing's average dose for an adult is 20 grains three times a day in a liquid mixture. If that prevents attacks, but bromism appears, the medicine is not interrupted at all, but reduced 10 or 15 per cent at a time, until a dose that can be tolerated is found. Toleration may be increased by adding about ten minims of tincture of nux vomica to each dose and also by adding arsenic, preferably as sodium cacodylate, from 0.002 to 0.005 gm. (from 1/30 to 1/12 grain). A laxative is often necessary, and the aromatic fluid-extract of cascara can be added to serve this purpose. If the amount of bromide is inadequate to restrain attacks, it is to be increased cautiously. When a dose is found which is sufficient and is well tolerated, it is to be continued for a long time and then cautiously reduced. Dropping from three doses a day to two of the same strength is too great a change to make at one time, but one might change from three doses of 20 grains to two of 25 grains.

But here is a matter of detail which may seem too simple and elementary for attention, but which is so vital and so commonly neglected that it is necessary to emphasize it. The physician must not only know how much bromide by weight he wishes to give the patient, but he must know just how much the patient gets. Eighteen grains may be too little and 22 grains too much. It not infrequently happens that a ready-made mixture of bromide is prescribed,

without memory of its exact strength, with the direction to take a teaspoonful (which may mean anything from half a drachm to 2 drachms), and so the patient gets a dose somewhere between 5 grains and 40 grains without any certainty as to the exact amount. Now suppose this dose is not just right and an increase or decrease of 10 per cent is desirable, how is it to be accomplished? Is it a wonder that bromide gets the reputation of being ineffective, or of being so poisonous that its effects are worse than those of the disease?

The remedy, of course, is simple—that is, for the physician to write the prescription giving the exact amount of each ingredient and then to have the patient measure the dose, which is usually a fluidrachm, in a small graduate glass, which will measure from 10 to 60 minims exactly. But vigilance is necessary. It is wonderful how much perversity patient and druggist can show in defeating the plan to have the dose accurately measured.

In case the major attacks are held in check, but the minor ones remain as frequent as before, it will do little or no good to advance to large doses of bromide. Instead from 5 to 10 minims of tincture of digitalis or half a grain of sparteine added to each dose may be of distinct service. Or, if there is much nervous irritability, from 2 to 4 minims of the deodorized tincture of opium with a corresponding increase in the laxative may be better. Occasionally, especially of late years, Pershing has used small doses of thyroid with advantage, and some patients with low blood-pressure might profit by the addition of pituitary substance; but Pershing has not tried the latter in this disease. If status epilepticus supervenes, instead of trying to control the convulsions by increasing the amount of bromide, one should keep this at the usual amount and give chloral in 15-grain doses every two hours, for the first few doses, or even every hour. If this does not quickly reduce the frequency of attacks, inhalations of chloroform should be used. If respiration is threatened, atropine and strychnine should be given hypodermically in the usual doses.

For many years past Pershing has followed the treatment here outlined in all of his private cases and has carefully recorded the clinical course in each. The results have been very gratifying.

CONTROL OF HEMORRHAGE FROM THE UPPER DIGESTIVE TRACT.

KELLOGG in the *New York Medical Journal* of September 15, 1917, writes a paper with this title, and in conclusion says that the following points should be emphasized: (1) Never operate during acute hemorrhage, nor in any case until there has been an attempt at a medical cure, except in cases showing pyloric obstruction, or considerable deformity of the stomach. (2) Operate in all cases in which hemorrhage recurs, or appears primarily, after a thorough course of medical treatment. Medical measures consist of absolute rest in bed; ice-bag; emetine; avoidance of early stimulation and overstimulation; lavage; hot enemas; transfusion; animal or human serum.

INDICATIONS FOR THE MASTOID OPERATION IN ACUTE OTITIS MEDIA.

DENCH states in the *Journal of the American Medical Association* of September 15, 1917, that he knows of no better means of making a diagnosis in these cases than by taking the history in conjunction with the otoscopic appearances. A middle ear that does not clear up after an acute otitis is a focus of disease—no matter if the drum membrane has healed—and the appearance on otoscopic examination will almost invariably demonstrate this fact. Those cases with few symptoms are frequently cases of streptococcus capsulatus infection, and as in many cases seen in consultation the bacteriologic character of the discharge has not been determined at the time of the primary attack, this fact should always be borne in mind. Dench has been so impressed with the importance of cases of this character that it has become his invariable practice in doubtful cases to recommend an exploratory operation. His experience has been, inva-

riably, that this operation was not exploratory, but really was an emergency operation. In other words, he has never failed in a single doubtful case of this character to evacuate pus from the mastoid.

History of Repeated Incisions.—Dench sees, each year, a certain number of cases giving a history of three, four, or five weeks' duration, or sometimes three or four months' duration, in which there is a persistent discharge, some pain, and a history of repeated incisions of the drum membrane. It may be taken as a rule to which there are few exceptions that in a case of acute otitis media one single competent incision of the drum membrane will drain the middle ear and adjacent structures perfectly if such drainage is possible through such a small opening. The moment that it is necessary to repeat these incisions, the indication for posterior operation becomes imperative. Repeated incisions of the drum membrane simply relieve temporarily the tension within the tympano-mastoid space. This temporary relief is really a great menace to the patient, because thereby the important symptoms of pain and temperature are masked, and both patient and surgeon are deluded into believing that the disease is mending, while in fact the inflammatory process is steadily attacking the deeper structures. Dench has only one word for repeated incisions of the drum membrane, and that is a word of absolute condemnation.

Impairment of Hearing.—Nothing is said up to this point about the impairment of function of the ear as an indication for operation. Whenever, in a case of acute middle-ear inflammation, either with or without solution of continuity of the drum membrane, we find a persistent profound impairment of function, this is in itself an important indication for operative interference. The middle ear, being a small space, should be easily drained by incision of the drum membrane, or, in the milder cases, the secretion resulting from the inflammatory process should be absorbed after a moderate interval of time. If there is sufficient involvement to cause profound impairment of hearing persisting for two or three weeks, this is an indication that the mastoid cells have become so involved that the middle-ear drainage alone is not sufficient; consequently posterior drainage is indicated.

Involvement of the Static Labyrinth.—Symptoms indicative of this complication call for prompt operative interference. These symptoms are vertigo and spontaneous nystagmus—usually toward the diseased side, more rarely toward the opposite side. Such symptoms may occur without actual labyrinthine involvement. They usually mean, however, a rather extensive infiltration of the bony structures immediately surrounding the labyrinthine capsule, and operative interference in all such cases is indicated.

Meningeal Symptoms.—Certain symptoms referable to the meninges may occur in obscure cases. By this Dench means localized headache—usually indicating an extradural abscess—or severe general headache, a much more dangerous symptom. Spinal puncture helps us in diagnosis in these cases. It should be remembered that a spinal fluid under pressure, with an excess of globulins, and a failure to reduce Fehling's solution, is not necessarily an indication of a general meningitis. Moreover, Dench has seen a very high cell count in the spinal fluid where a simple mastoid alone was present. These signs are an imperative indication for a complete mastoid operation and also for the exposure of a large area of dura about the mastoid wound. They are not necessarily, however, indications of a diffuse meningitis.

Roentgenoscopy.—In all Dench's cases of mastoiditis, roentgenoscopy has been of great value. This is particularly true in those cases in which the history is indefinite—when there is a history of acute otitis occurring several months prior to the time of seeing the patient, then an almost complete cessation of the aural symptoms, and yet on examination the canal presents certain well-defined changes. Invariably, in cases of this character, a study of the roentgenograms, in conjunction with the roentgenographer, have enabled Dench to

locate a distinct focus of suppuration within the mastoid, and at operation he has never failed to find the pus in the location shown in the roentgenogram. The value of roentgenograms in the earlier cases is perhaps not as evident. Cases of acute otitis will show a cloudy mastoid within the first ten days. In doubtful acute cases it is only by the study of roentgenograms, taken at intervals of a week or ten days, that we are able to arrive at a definite diagnosis. In the doubtful cases, however, and especially in cases in which the acute symptoms have been slight and when we suspect streptococcus capsulatus infection (and this has, incidentally, been determined at operation in most of these doubtful cases), the roentgenograms have been of the greatest value.

THE SUITABILITY OF THE MORE SOLUBLE SALTS OF QUININE AND CINCHONINE FOR INTRAVENOUS INJECTION.

In the *British Medical Journal* of September 22, 1917, ROGERS records experiments on animals, but states that owing to the lack of clinical material under his control he has only been able to try quinine intravenously in a very few cases of malaria. So far Rogers has only given the bihydrochloride and the acid hydrobromide in ½-gramme doses once a day for three or four days, but without observing more rapid disappearance of the fever and of the parasites than after quinine by the mouth, so larger doses will evidently be necessary if all the parasites are to be rapidly destroyed. As three grains of the bihydrochloride contain as much quinine as four of the acid hydrobromide, after commencing with ½-gramme doses to ascertain whether the patient has any idiosyncrasy toward the drug, up to 12 grains of the bihydrochloride or 16 grains (approximately 1 grm.) of the acid hydrobromide, in 7½ and 10 Cc. respectively of normal saline (making practically 10-percent solutions), may be given once daily for at least four days. It will probably be advisable to supplement the intravenous doses with quinine by the mouth, as the former is likely to be rapidly excreted through the kidneys—a point Rogers is now investigating. In any case prolonged oral administration should follow the more active intravenous medication.

Once the resistant relapse-producing stages of the malarial parasite have been produced intravenous quinine is not so likely to be so effective, but the vigorous treatment of primary attacks of malaria by intravenous quinine appears to be worthy of careful trial to ascertain if the frequency of subsequent relapses can be reduced. Military hospitals in malarial areas should afford much more favorable opportunities for following up cases sufficiently long to enable this suggestion to be tested than civil practice. A further material advantage of such early intravenous administration is likely to be that dangerously large infections, which may terminate at any moment in fatal coma under oral administration of quinine, are likely to be rapidly controlled, and the present mortality from malaria to be reduced to practically *nil*.

DIABETES INSIPIDUS: A METABOLIC STUDY OF THE EFFECT OF PITUITARY ADMINISTRATION.

In *Endocrinology* for July-September, 1917, WILLIAMS proceeds to discuss this subject as follows:

1. A brief résumé of the literature in which most of the recent writers regard the disease as due to hypofunction of the hypophysis.

2. A clinical description of a case in a woman, aged fifty-eight years, in which the chief symptoms were thirst, polyuria, pain in head, back, and limbs; impaired eyesight; loss of weight.

3. Physical examination: leucodermic patches on arms and chest, dry skin, body otherwise normal. Patient nervous and irritable.

4. Previous illness negative; family history of cancer, diabetes, and insanity.

5. *X*-ray examination: sella turcica slightly enlarged, anterior clinical processes thin; posterior clinoid processes thin and of mushroom type.

6. Eyes: concentric contraction of visual and color fields, and other changes suggesting a functional disturbance due to physiological factors.

7. Average amount of urine passed daily when no pituitrin was given (78 days), 6277 Cc. Average amount passed daily when pituitrin was given (142 days), 3767 Cc.

8. Diets low in carbohydrates, proteins, fats, and salt had little effect on diuresis.

9. Administration of anterior lobe pituitary body by mouth was ineffective in controlling diuresis.

10. Administration of posterior lobe by mouth was also without effect. [This seems to contradict statement No. 7.—ED.]

11. Removal of spinal fluid to lessen intracerebral pressure diminished diuresis for one day only.

12. The effect of pituitary administration is purely transitory. Its continued use over a period of eight months has afforded no evidence of permanent improvement.

13. The blood sugar level on a diet rich in carbohydrates was inappreciably influenced by the administration of pituitrin.

14. There was a considerable increase in the cholesterin and fat content of the blood which was uninfluenced by the treatment.

15. The study of the urine excretion by means of the Mosenthal two-hour renal test showed that when pituitrin is not given the kidneys eliminate large and variable amounts of urine during the day and an even greater amount during the night period. The percentage of solids or specific gravity is fixed on a low plane and fluctuates very little. When pituitrin is administered, much less urine is excreted during the day periods, but the night amount is quite as large as in the previous test. The percentage of concentration of solids in the urine is much greater and more variable. Without pituitrin, nitrogen elimination was quite variable during the day with a pronounced response to the noon meal, although the percentage of concentration was fixed during all but two of the periods. The administration of pituitrin seemed to stimulate nitrogen excretion during the latter part of the day and during the night, more than half of it being eliminated during the night hours. Salt elimination is also on a higher plane after the administration of pituitrin.

When pituitrin is not given, salt elimination is on a low plane, there being quite a well-marked fixation of concentration. When pituitrin is administered, both the amount and the percentage of concentration vary considerably, showing that the kidneys have a greater amplitude of function. As in the case of water and nitrogen, more than half of the salt is eliminated during the night hours.

16. The blood creatinin was normal. The urea content of the blood was normal, and the rate of excretion was apparently improved by the administration of pituitrin, as evidenced by the lower Ambard coefficient.

THE IMPORTANCE OF TIME IN THE TREATMENT OF TUBERCULOSIS.

KIRK in the *Southern Medical Journal* for October, 1917, makes the following points:

1. The time spent in arriving at a diagnosis is not considered as lost, for it is almost as great a mistake to brand a case tuberculosis with all the resulting consequences as to fail to recognize the disease.

2. After the diagnosis has been made no time should be lost before commencing treatment.

3. It is economy in both time and money to send patients from home for treatment when they can afford to go, provided their means are sufficient to supply as good or better accommodations and they can obtain the necessary care and attention.

4. Satisfactory results can only be expected if the time is spent as it should be under competent supervision.

5. There can be no compromise, makeshift, or subterfuge with the disease once it has asserted itself until arrested or cured.

6. We should not be content to let the patient simply loaf while taking the cure, but should employ other agents as well that are known to assist and improve metabolism.

THE WASSERMANN REACTION.

In the *Southern Medical Journal* for October, 1917, HENSON gives the following advice, which governs treatment:

1. It is advisable for the serologist to abstain from going into the clinical features of a case.

2. He should be guarded in submitting border-line reactions without commenting upon the significance of such reactions.

3. Border-line reactions should not be accepted by the clinician as diagnostic of syphilitic infection unless supported by clinical symptoms.

4. A single negative reaction should never be allowed to exclude a diagnosis of luetic infection.

5. The Wassermann test should be applied from time to time during the course of the disease to note the effect of therapeutic measures employed; and

6. A case of syphilis should not be finally discharged until several negative reactions have been obtained, the last one to be at least eighteen months and preferably two years after treatment has been discontinued.

NOTES ON MALARIA FOR OFFICERS AND MEN.

In the *Lancet* of September 29, 1917, CHRISTY of the Royal Army Medical Corps tells us that soldiers as well as medical men must know how to prevent malarial infection, and that with this aim in view the following facts have been collected for the instruction of officers and men:

1. Malaria is a parasitic, infectious, epidemic disease, conveyed from one person to another by the agency of mosquitoes.

2. The microscopic parasite causing it lives and develops in the corpuscles of the blood of man, and in the body of the mosquito.

3. There is no evidence to show that it can exist in any other animal, or possibility of its existing free in nature.

4. When blood containing the parasite is sucked up by the mosquito from a person recovering from an attack of "fever," the parasites develop and multiply in the body of the insect, and after three to five days may be injected by it through the skin into the blood of other men, causing, after an interval of eight to ten days, all the train of symptoms known as malarial fever.

5. *The Malaria Parasite.*—Shortly after the mosquito bite and the arrival of the parasites in the blood-stream they enter and commence development within the corpuscles.

6. After an interval of a few days the parasites have so multiplied in the blood of the person bitten that an attack of fever sets in, the length of the interval mainly depending upon the number of bites, the number of parasites injected, and the temperature prevailing.

7. The fever may therefore not commence until the person is many miles from where he was bitten.

8. After an untreated attack has run its course the fever subsides and the microscope no longer shows active parasites within the corpuscles, but there still remain in the body two forms of the parasite: (*a*) Latent or resting forms in the liver, spleen, etc. (*b*) Specialized crescentic forms in the general circulation.

9. (*a*) The latent or resting form retire after the attack from the general circulation and remain inactive in the liver, spleen, etc., until perhaps the treatment is relaxed, or till such time as the resisting power of the individual is lessened by chill, sun exposure, exhaustion, or other causes, when they may return to the circulation and again become active within the corpuscles, producing a relapse and a return of the patient to the hospital.

10. The relapse has most of the features of the primary attack with all its train of symptoms and ill effects.

11. (*b*) The crescentic bodies are not formed until the attack has run its course.

12. They remain in the general circulation beneath the skin for weeks, causing no symptoms, but when sucked into the stomach of certain species of mosquitoes they at once become active, and after certain changes pass from the stomach contents into

the stomach wall, multiply enormously, and eventually invade the salivary glands of the insect, from whence they are injected during the act of sucking into the blood of man as fever-causing parasites. The mosquito has the power at the moment of sucking of injecting through a special tube in its proboscis an irritating salivary secretion probably for the purpose of preventing premature coagulation of the blood.

13. Only the crescentic bodies are capable of infecting, and developing in, the mosquito, and not the active forms of the parasite as seen in the corpuscles during the attack.

14. If after some weeks the crescentic body has not found its way to the mosquito's stomach it may die, or it may retire from the general circulation to the liver or spleen, where it can remain without causing symptoms for a long time. But any severe constitutional disturbance, such as might be caused by the removal of the individual from a warm to a cold climate, may result not only in these bodies reappearing in the circulation, but in their having the power to multiply and produce a crop of active fever-causing parasites, and what is known as recurrent attacks, even after the lapse of two or three years.

15. As in the case of the relapse, the recurrent attack has most of the features of the primary attack, and any one returning, say, to South Africa and suffering from a recurrent attack, even in a district hitherto free from malaria and years after his return, may become a danger to his friends, or even the nucleus of an epidemic, if the right kind of a mosquito happens to be an inhabitant of the neighborhood and if mosquito-net precautions are not thorough.

16. *The Mosquito.*—Only the female mosquito has the power of sucking blood, the male subsisting upon the juice of plants, fruit, etc.

17. Not all species of mosquito can convey malaria. The majority of the common species are harmless (except those which transmit yellow fever, elephantiasis, etc.).

18. The few species which are capable of conveying it belong to the class *Anophelinæ*, all of which are fragile insects not easily seen, comparatively silent, and whose bite leaves little irritation.

19. It is therefore unwise to commit oneself to the remark, so frequently heard, that there are no mosquitoes in a particular place or camp, without the opinion of an expert.

20. All mosquitoes lay their eggs upon water, and the larval and pupal stages of their life are spent in the water. They wriggle to the surface periodically to breathe.

21. When the pupa is ready to change into the mature insect it rises to the surface, the pupa-case splits down the back, the mosquito emerges, and, after an interval for its newly-formed wings to harden, it flies away.

22. If a thin layer of kerosene oil be spread upon the surface of the water neither larvæ nor pupæ can get their breathing tubes to the surface, and all die of suffocation, a never-failing and ever-ready method of preventing mosquitoes hatching out of receptacles which cannot easily be emptied of water.

23. Where there is no water there can be no mosquitoes.

24. No other inesct can convey malaria. Where there is malaria there must be anopheline mosquitoes.

25. It does not follow that because there are anopheline mosquitoes there must be malaria. The insects though present may not have been infected and therefore may be harmless.

26. One bite is sufficient to cause an attack, and one infected mosquito may give malaria to several persons in one night.

27. Those species of anopheline mosquitoes which convey malaria are not usually found away from human habitations, or if found are not likely to be infected. Consequently men on picket duty, or in bivouac or temporary camp, although severely bitten by mosquitoes, often run less risk of malaria than those in camps or hospitals on lines of communication, where numbers of men who have suffered from malaria are congregated and where every anopheline mosquito is likely to be infected.

28. *The Mosquito Net.*—The segregation of the individual beneath an efficient net at night is by far the most important and effective means, not only of guarding against a primary attack, but of preventing infection being carried from the sick person to healthy persons.

29. Owing to the development of crescentic carrier bodies after and during the continuance of the fever the use of an efficient mosquito net is far more important to the welfare of the community after than before the attack.

30. One person or even a baby with crescentic bodies in his blood sleeping without a mosquito net, or with one that is defective, may be and often is the nucleus of an epidemic.

31. Hence arises the danger of sleeping near a native village, because in a malarial locality a large percentage of the youngest children have active parasites and crescentic bodies in their blood, and yet they play about without showing symptoms of fever.

32. Adult natives, on the other hand, in a malarial locality are not usually a danger, for having suffered severely in early childhood they have acquired a partial immunity, and in consequence suffer little from malaria.

33. Strangers, however, from upland regions where there is no malaria, not having suffered from the disease in childhood, have acquired no immunity, and are soon likely to be infected on reaching a malarial district at a lower level.

34. Indians rarely seem to acquire any immunity, and are very susceptible to malaria. Their proximity is a danger to Europeans.

35. A mosquito net to be effective should be large enough to prevent the arms and knees being bitten through it, and also to allow of its being tucked in all around.

36. An efficient mosquito net properly used is a protection in tropical Africa against attacks from many harmful insects and animals besides mosquitoes. For example: Flies which lay their eggs in the skin or in the nose at night, the maggots hatched from which sometimes cause irreparable injury or even death; scorpions; several species of dangerous centipedes; poisonous ants; beetles of many sorts which injure by biting, ejecting poisons, or by entering the ears; ticks whose bite conveys fever; snakes, lizards, rats, etc., and, by means of its calico top, from dust and dirt dropped from above in hut or tent, or from heavy dew when sleeping in the open.

37. The lightest and smallest net which can be made serviceable under all circumstances, whether in hospital, clearing station, camp or bivouac, is one with calico top 5 feet 6 inches long by 2 feet broad and with sides 3 feet deep (2 feet of netting and 1 foot of calico tuck-in). At each four top corners are double tapes, 8 inches long, for fixing the net to its supports.

38. The latest approved ordnance pattern is a rectangular net of the above dimensions. To be effective it must be suspended by means of its corner tapes inside its supporting sticks, otherwise it cannot be tucked in. On no account should it be placed over its supports nor allowed to sag or hang loose.

39. For military purposes the mosquito net should of course be khaki, or any less conspicuous color than white, but khaki netting being unobtainable it is advisable for each man for his own safety to dye his net with Condy's fluid, or other coloring agent.

40. There are other methods of individual segregation than by the mosquito net. The best of these is by the use of "bamber oil," a mosquito lotion used extensively by coolies on the plantations in Ceylon, etc. Its composition is as follows:

> Citronella oil (not lemon-grass oil), 1½ parts;
> Kerosene (paraffin) oil, 1 part;
> Cocoanut oil, 2 parts.

To which is added carbolic acid 1 per cent. Its efficacy lasts from four to six hours, sufficient to give a night's sleep in comparative safety when a mosquito net is not available or cannot be used.

41. *Quinine.*—Quinine is the only drug in the world which will kill the malaria parasite, and consequently quinine is the only drug of any use as a prophylactic against malaria—that is, for the prevention

of primary attacks—and it is the only medicine which will cure the disease.

42. Quinine being absorbed into the blood kills the parasite freshly injected by the mosquito, but when after three or four hours these have entered the corpuscles quinine has less effect upon them.

43. Quinine should therefore be taken early after any risk has been incurred, but as the exact time of the risk can rarely be determined the best way to accomplish this is to take it frequently.

44. A daily dose of 5 grains after the evening meal is for many reasons the wisest procedure.

45. A dose of 5 grains taken at 10 P.M. will kill any parasites which may have been injected by mosquitoes during the evening, and will remain in the blood long enough to put out of action any that may be introduced up to 6 A.M. next morning. The hours of daylight need not, of course, be provided for.

46. If quinine is taken only on Saturdays and Sundays a person may be bitten by infected mosquitoes on the Monday, and the parasites so injected may have so multiplied in the body by the time Saturday comes round again that an attack of fever is unavoidable.

47. Quinine alone will not reduce the chances of infection more than perhaps 25 or 30 per cent, but quinine plus the intelligent use of an efficient mosquito net should reduce those chances by at least 90 per cent.

48. Quinine is the only specific for malaria. It cuts short the attack by killing the young parasites as each successive crop develops in the blood.

49. If taken in sufficient quantities during the attack it will prevent the formation of the crescent bodies, which once formed constitute the convalescing patient a danger to his fellows, and in spite of quinine may remain in the body for a long period.

50. A slight attack is just as dangerous in this respect as a severe one, and a person refusing to go sick "for a little fever" and neglecting to take quinine deserves to be severely dealt with.

51. If continued after the attack in sufficient doses daily it will account for all the resting, latent forms of the parasite in the spleen, etc., prevent relapses, and bring about a permanent cure, but the mosquito-net protection must be efficient and fresh attacks from bites of infected mosquitoes not allowed to supervene.

52. A good method of quinine after-treatment—that is, from the date of the subsidence of the fever—is as follows:

At least 20 grains daily for 2 weeks.
15 " " " 2 "
5 " " " 2 months.

53. With the quinine may be combined, if necessary, iron and arsenic tonics as ordered by the medical officer.

54. Opinions regarding the after-treatment by quinine frequently differ as to when and how the drug should be taken, but the main point to realize is that the dosage should be daily for three months and the daily dose sufficiently large during the first month of the three. If a relapse should occur the three months' treatment must be commenced afresh.

55. Neglect of quinine after the attack will certainly result in a relapse, which may mean the development of additional resting forms and crescentic bodies, as well as the further decrease of the resisting power of the body, tending to other relapses and general debility.

56. The deafness and other slight effects of taking quinine are not permanent. However unpleasant the effects may be they are infinitely preferable to the risk of permanent inefficiency or loss of life.

57. Although the taking of quinine has in some cases resulted in the passing of black water unaccompanied by any fever, quinine is certainly not the cause of blackwater fever.

58. Although we may not know precisely what is the cause of this disease, there is plenty of evidence to show that malaria is the initial factor. To prevent malaria by the careful use of a net, or to bring about a permanent cure by energetic after-treatment with quinine, is the only way of avoiding risk of blackwater fever.

A COMBINED METHOD FOR THE LOCALIZATION AND EXTRACTION OF PROJECTILES.

FLINT (*Military Surgery,* 1917, xl, 259) states that many methods for the localization and extraction of bullets and projectiles have been brought forward during the present war. The method proposed by the author is ingenious and deserves careful consideration.

The first step is to locate by means of the fluoroscope and looped compass a series of points on the body. Imaginary diagonals through these points would necessarily pass through the projectitle. In order to obtain a graphic idea of the relations of the projectile a band of soft metal is encircled around the body and the localizations of the several points above mentioned are marked on the band. This band is then transferred in the same shape and size that it had while on the body to a sheet of paper and a tracing made around the band. This tracing represents the shape and size of a cross-section of the body at the level of the projectile. The several points marked on the metal band are then marked on the paper, diagonals drawn through them, and the depth of the projectile thus determined. By reference to cross-section atlas the relations can easily be traced in the drawing and the same used for reference during the operation.

The proper site for incision can be traced on the patient and the patient then sent, along with the chart, to the operating room. —*Surgery, Gynecology and Obstetrics,* September, 1917.

GUNSHOT INJURIES OF THE CHEST, WITH ESPECIAL REFERENCE TO HEMOTHORAX.

BRADFORD (*British Medical Journal,* Aug. 4, 1917) notes that hemothorax is the most common result of chest wound, both pneumothorax and hemopneumothorax being comparatively rare; in 328 cases only four of the former and eight of the latter were observed.

The hemothorax may be sterile or infected and the latter complication may come early or late. If early, in the first few days, doubtless due to infective material being carried in with the missile. In such cases the exploration of the hemothorax reveals the presence of organisms in the fluid withdrawn. Infection, however, may occur later—that is, in the second or third week after the receipt of the wound. Such cases may at first run the course of a sterile hemothorax, with but few symptoms, the fluid removed failing to show the presence of organisms. There will be a sudden outbreak of increasing fever, dyspnea, pain, rapid pulse, and jaundice. Paracentesis shows the presence of organisms. Infection may be more or less localized, more especially in the lower portion of the chest. Under such circumstances paracentesis may yield different results according to the site explored, this being especially the case in anaerobic bacillary infection. In a series of 450 cases of hemopneumothorax observed by Bradford and Elliott infection was observed in 117—that is, roughly in 25 per cent, mostly streptococci, staphylococci, and anaerobic gas bacilli were found, showing that the infection is usually derived from the skin or clothing.

Death from hemorrhage as the result of wound of the chest is very rare. Thus in a series of 78 fatal cases of simple hemothorax there were 70 in which either infection or an additional visceral complication, or both, were present. In the remaining eight cases, in which death might have been due to the hemorrhage, purulent bronchitis was present in three, and in four cases no record existed as to whether sepsis was present or not, thus leaving only one case in which hemorrhage alone could be definitely asserted to be the sole cause of death. Septic infection is by far the most frequent and therefore the most important cause of death in cases of hemothorax that survive the first few days immediately following the wound.

Secondary hemorrhage is extremely rare, and in a record of 100 fatal cases only three instances were recorded. In two the hemorrhage took place in the pleural cavity, and

in one a fatal hemoptysis occurred from a vessel in the vicinity of a small abscess in the lung from a fragment of shell. Bradford has seen only one other instance of fatal hemoptysis due to secondary hemorrhage in the course of many hundred cases of gunshot wound of the chest. This was due to a lesion produced by a fragment of shell embedded in the lung.

The fluid in the chest in case of hemothorax consists in the main of defibrinated blood. This fluid contains no fibrinogen. Clotting has already taken place, possibly as the result of movements imparted to the effused blood as the result of respiratory and cardiac efforts. There is also pleural exudate. It is most abundant in infected cases. Indeed, a sudden rapid increase of the fluid in the chest is usually indicative of infection since secondary hemorrhage is extremely rare. The gas formed is usually offensive, suggesting feces or rotten eggs, and may be present under considerable pressure, and if drawn through a cannula burns a bluish flame—the latter shown by postmortem examination. The picture is one of rapidly progressive pneumothorax. The thick fibrin layer deposited on the pleura in the sterile cases is greatly increased by infection. The origin of the blood is usually pulmonary, though it may be derived from the vessels of the chest wall.

As to signs and symptoms, dyspnea, although often at first urgent, diminishes rapidly, and even when the quantity of fluid in the chest is large—that is, over three pints—it is not usually a marked feature after the first three days. It is, however, greatly increased by exertion and movement, and hence many patients on arrival at a base hospital after a long journey have considerable dyspnea and distress for twenty-four hours. Moderate pyrexia is usually present, and it may rise to 103° F.; but the pulse is not much accelerated and is usually under 100, and the patient does not have much distress unless cough is severe, frequent, and painful. The continued presence of high fever, pain, distress, rapid pulse, and furred tongue should always suggest the possibility of the hemothorax being infected, and a sample of the fluid should be removed with an exploring syringe without delay in order to determine this point by bacteriological methods.

Jaundice is an important sign, as, if marked, it is characteristic of infection, and more especially infection with anaerobic bacilli. In simple sterile hemothorax only a slight icteric tinge is present in the conjunctiva, but in anaerobic infections a deep yellow jaundice involving the skin generally develops, often with great rapidity. Such a jaundice is often misinterpreted as indicating a wound of the liver, especially when the wound is in the lower chest, but jaundice is quite exceptional in liver wounds, whereas it is a very characteristic sign of infected wounds, and especially of anaerobic infections. It may also be seen in the course of streptococcal infections.

The physical signs produced by hemothorax present considerable variety and often are very difficult to interpret. They are much more complex than those usually regarded as characteristic of simple pleural effusion.

One outstanding sign, easily demonstrated by percussion and confirmed by *x*-ray examination, is that the diaphragm on the affected side is much higher than normal. The high level of the diaphragm is most easily demonstrated in left-sided hemothorax, since then the tympanitic percussion note due to the stomach resonance is readily obtained high up in the axilla, and also in the anterolateral region of the chest. In some instances this tympanitic stomach resonance may reach so high a level as to merge into the area of skodaic resonance in the infraclavicular region above the level of the fluid, and unless care is taken a mistaken diagnosis of pneumothorax may readily be made. *X*-ray examination often reveals that the diaphragm is not only high but also immobile. The skodaic resonance obtained in the upper chest above the level of the fluid is usually much more marked and much more extensive in its distribution than that present in ordinary pleural effusion, and not infrequently extends beyond the middle line, and this fact again

is liable to lead to confusion of the condition with pneumothorax. The distribution of the skodaic resonance is confirmed by the observations on the morbid anatomy, as these show that the upper portions of the lung, especially anteriorly, are greatly overdistended and emphysematous, and that quite frequently the upper lobe is so overdistended as to extend well beyond the midsternal line.

The high level of the diaphragm, notwithstanding the presence of a large amount of fluid in the chest, and the very extensive and marked skodaic phenomena are two striking features of hemothorax and are in contrast to what obtains in simple pleural effusion. Over the area occupied by the fluid, blowing tubular or even cavernous breath sounds are frequently heard on auscultation. They are not only more marked than those occasionally heard over pleural effusions, but they are also heard over a much larger area, instead of being limited, as in pleural effusion, to a small area in the vicinity of the angle of the scapula.

Bronchophony and egophony are also well marked and very definite; pectoriloquy is by no means rare. The physical signs thus often present a more or less clear resemblance to those usually regarded as characteristic of pneumonic consolidation, and it is not surprising that in a considerable number of cases in which hemothorax is present the erroneous diagnosis of so-called traumatic pneumonia is made.

In sterile hemothorax, if the amount of the bloody effusion is small, there is no need for any special active treatment; such cases do well, although their progress may sometimes be slow. If the effusion is at all large in amount—that is, the dulness reaching above the angle of the scapula—the fluid should be removed by aspiration about the end of the first week after the wound. In a few cases earlier aspiration may be required to relieve distress arising mechanically from the amount of fluid present. Aspiration with oxygen replacement is better than simple aspiration, since by this method, with suitable local anesthetics, the operation can be carried out without discomfort to the patient and without any of the symptoms that so commonly occur in ordinary aspiration, and not infrequently prevent by their urgency the completion of the procedure. Further, with oxygen replacement practically all the fluid present in the chest can be removed at one sitting; this is rarely feasible with ordinary aspiration, where the development of such symptoms as a sense of constriction, distress, cough, etc., occurs before all the fluid has been removed. These unpleasant symptoms develop as a consequence of a too sudden change in the intrapleural pressure resulting from the rapid removal of fluid, together with incomplete adjustment owing to incomplete expansion of the lung. Different patients vary considerably in the degree of their tolerance of pleural pressure changes, and these are necessarily much influenced by the degree and rapidity with which the lung reëxpands. With an oxygen replacement apparatus a measured quantity of oxygen at any desired pressure can be introduced, and thus violent and sudden changes in the intrapleural pressure are avoided.

For practical purposes it is not necessary to measure accurately the intrapleural pressure; it is sufficient to regulate the introduction of oxygen by the presence or absence of symptoms. The aspiration of the fluid should be temporarily stopped when distress or a sense of constriction is first noticed by the patient; if the symptoms do not subside at once, a small quantity of oxygen from the oxygen replacement apparatus (Parry Morgan or other) should be allowed to flow into the pleural cavity. Then with the relief of all distress, a further quantity of the fluid can be aspirated and the process continued until the operation is completed. The patient is left at the end of the aspiration with a small quantity of oxygen in the pleura—for example, 200 to 500 Cc. at a pressure considerably less than the pressure of the hemothorax, but still appreciably above the normal pleural pressure. The oxygen is gradually absorbed in the course of the following week, but it is remarkable that many days are required for the pleura to absorb even small quantities

of gas, and this slow absorption is probably due to the coating of the parietal and visceral pleura with fibrin, as it is in remarkable contrast to the rapid absorption of air that is known to occur after opening the normal pleura.

Free drainage is required in all cases of infected hemothorax, and it is of the utmost importance that this should be provided as early as possible, as the organization of the deposit of lymph on the visceral pleura produces a great impediment to the rapid expansion of the lung after the removal of the fluid, and this organization proceeds rapidly in cases in which delay in operating takes place. Removal of the infected fluid by free drainage is, however, not sufficient treatment in all cases; the inflammation in the pleural sac and the septic clots must be treated by the local application of some efficient antiseptic, applied either by periodical washing out of the cavity or else by the instillation method and the Carrel-Dakin technique that is now so much used. If the cavity is treated by washing out, care must be taken to avoid raising the intrapleural pressure. Septic clots, often of considerable size, can be removed with success by this method. Recently the Carrel-Dakin technique has been applied with success to cases of infected hemothorax, and a few cases have already been so successfully treated that the operation wound required for the excision of the rib has been closed by secondary suture before the evacuation of the patient to England.

Two difficulties are met with in practice in cases of hemothorax. In one group of cases, although the pyrexia and the patient's general condition suggest the presence of infection, bacteriological examination does not confirm this. In another series of cases organisms are detected in the fluid, but there is little or no pyrexia, and the patient does not seem to be very ill. It is probable that some of the cases falling into this second group recover after simple aspiration, but their convalescence is often very slow, and certainly in some instances such cases develop serious and even urgent symptoms. For these reasons it is advisable to excise a portion of rib and procure free drainage in all cases of hemothorax in which the bacteriological examination reveals the presence of pathogenic organisms, even if the clinical condition of the patient is not such as to suggest infection. As regards the first group, the position is more difficult, but it is probably wiser to delay opening the pleura until proof of infection in the fluid is obtained, as the pyrexia and even the other symptoms may have some other origin; it is a serious matter to open a sterile hemothorax in view of the possibility of secondary infection.

Care must be taken in selecting the site for excision of a portion of rib to provide really efficient drainage, and the fact that the diaphragm is abnormally high in these cases must be borne in mind, as otherwise the opening will be made too low down.

In some instances the wound of entry or exit communicates more or less directly with the pleural cavity and fluid in variable quantity drains from it; this drainage is rarely satisfactory or sufficient, and such cases require a counter-opening in a suitable situation to really drain the effusion.

AN ANALYSIS OF 133 FRACTURES OF THE SPINE TREATED AT THE MASSACHUSETTS GENERAL HOSPITAL.

The statistical tables given confirm the accepted view that there are two regions of the spine especially likely to suffer fracture, the mid-cervical and the dorsolumbar. In addition to compression fractures of the vertebral bodies and fractures of the vertebral processes, there were three cases of fractures of the intervertebral discs. The injury most frequently complicating fracture in the cervical region is fractured skull; in the dorsal region fracture of the ribs is the most common injury; and as complicating injuries of the lumbar spine fractures of the lower extremity are most frequently noted. When shock is present it is generally due to complication and not to the spinal fracture itself. A fact of great importance is that of the 67 patients who had cord lesions, in 66 the onset of the paralysis was

immediate, and in only one was it gradual. Priapism is a bad prognostic sign. Subjective pain at the site of the fracture was conspicuous by the infrequency of its mention. Localized tenderness was present in practically every instance of fracture of the spine. And as a corollary to this, localized tenderness over the spine should always suggest the possibility of fracture. For a satisfactory *x*-ray plate it is often necessary to take several exposures, and further, the usual anteroposterior views, though the plates be excellent, often do not clearly show a compression fracture that is unmistakable in the lateral view.

Conclusions as to the condition of the cord drawn from the appearance of the cerebrospinal fluid got by lumbar puncture may be misleading. A bloody cerebrospinal fluid may indicate that the cord is lacerated, but clear fluid does not exclude the possibility of severe trauma of the cord. The operative findings indicate that extradural and subdural hemorrhages, secondary to spinal fracture, are infrequent, and rarely large enough to account for compression symptoms. In not a single instance was bone pressure on the cord demonstrated.

Taken as a whole, the results of laminectomy in this series of fracture of the spine do not justify an argument in favor of operation, but on the contrary serve as a warning against radical surgical treatment. Four deaths to which operation directly contributed, in thirty-five cases operated upon, is a high mortality. In this series of cases, with one exception, the onset of paralysis did not succeed the injury, but was the direct accompaniment of it. The paralysis was present before the effects of hemorrhage, or edema, or bone pressure could work on the cord. The cord hangs so loosely in its dural envelope that a very considerable hemorrhage may occur within the dural sheath and no compression of the cord result, and there is ample room for any swelling of the cord from secondary edema. Bone pressure must be rare, and in such instances irreparable damage has been done before operation can be accomplished. Furthermore, Taylor's observations that cord lesions occur at a distance from the level opposite the site of fracture, seem to be given no weight by those authors who are enthusiastic proponents of routine laminectomy in cases of vertebral fractures with accompanying cord symptoms. Sixteen per cent of the necropsies showed cord lesion so remote from the site of injury that an ordinary laminectomy would completely fail to reveal them.

Laminectomy cannot be considered other than a major operation, and the desperate condition of the patient does not warrant the surgeon in adding the risk of operation unless there is more than a visionary chance of bettering a hopeless condition. A major operation is not justified on the basis that it will do no harm, and can conceivably though improbably do good. Laminectomy is indicated in the rare cases of gradual onset of medullary symptoms, and in patients who, originally free from cord symptoms, begin to develop symptoms referable to the cord.—*Cleveland Medical Journal,* September, 1917.

EIGHT CASES OF SYPHILIS OF THE STOMACH.

Downes (*Surgery, Gynecology and Obstetrics,* October, 1917) quotes Smithies to the effect that 26 cases of syphilis of the stomach were noted in an examination of 7545 patients suffering from all types of dyspepsia—in other words, 0.3 per cent. There was five times this percentage of syphilitic lesions in patients who apparently suffered from pathological changes in the stomach and duodenum. Downes reports eight cases occurring in St. Luke's Hospital. He notes that the disease may be congenital or acquired. Two of the cases here reported were undoubtedly of congenital origin; one in a female, aged fourteen, the other in a male, aged seventeen. A history of stomach trouble extending back many years was obtained in both instances. In the six cases of the acquired type, two gave definite histories of chancre, while in the remaining four there was no history of primary infection.

The lesions vary from a diffuse syphilitic gastritis, with round-cell infiltration spreading through the submucous tissue, to localized or general gummatous infiltration involving all the coats. These gummatous deposits may be single or multiple and not infrequently ulcerate. One portion of the stomach wall may remain infiltrated while another passes on to ulceration, or in the healing stage becomes cicatricial. The irritation of the peritoneal coat results in perigastric adhesions of varying extent. Definite pyloric obstruction may occur as a result of the gummatous infiltration, cicatrization of the ulcer, or from the perigastric adhesions. It is for the relief of this complication that surgery plays an important rôle in the treatment of the disease. Besides the lesions in the stomach wall, other evidences of lues are usually found, such as changes in the liver capsule, gummata of the liver, extensive involvement of the gastrohepatic and gastrocolic lymph glands, as well as other evidence of a generalized syphilis.

The symptoms of gastric syphilis taken as a whole vary but little from those of other stomach lesions of similar extent; however, upon careful analysis, several striking differences become apparent. The pain which is a most constant symptom lacks the periodicity of that occurring in the average simple ulcer, and it is not so much influenced by the taking of food. It is frequently worse at night, and is often referred to as gnawing in character. Vomiting is a persistent and annoying symptom.

The diagnosis of this condition can be established with a fair degree of certainty if the clinical and laboratory findings are given proper consideration. In the congenital cases, the family and previous history of the patient, his general development and appearance, with the symptoms of chronic stomach trouble, should arouse suspicion. The acquired cases may be more difficult to diagnose, but the past history plus unusual symptoms should suggest that the case is out of the ordinary. In both types the course of the disease differs from the simple gastric or duodenal ulcer, in that it is influenced but little by dieting and the ordinary methods of treatment, and it is unlike malignancy in that there is not the steady and continuous progress to a fatal termination. A positive Wassermann reaction with roentgenographic findings, of persistent and unusual deformity of the stomach, establish the diagnosis beyond much doubt. In view of the accuracy of modern laboratory aids to diagnosis, one hesitates to refer to the so-called therapeutic test, but the value of antisyphilitic treatment in confirming the diagnosis of syphilis in general cannot be ignored. Such treatment may be of temporary benefit in ordinary ulcer or even cancer of the stomach, but the improvement is of short duration, whereas in the luetic cases there is almost immediate and continued relief from symptoms.

Owing to the close resemblance between syphilitic infiltration and tuberculosis, and the difficulty of staining for spirochætæ pallidæ, the pathologic diagnosis of syphilis of the stomach is extremely difficult to establish.

Concerning the eight cases which Downes reports, in five gastroenterostomy was performed to remove obstruction. The remaining three, even though vomiting was present, showed bismuth flowing through the pylorus. For this reason operation was not indicated. Under treatment recovery was rapid. One case died of Bright's disease. This patient had been observed in the hospital one year after the diagnosis of syphilis of the stomach had been made, suffering from syphilitic aortitis and myocarditis. The gastric symptoms were relieved by treatment plus gastroenterostomy. The remaining seven cases remained well from the clinical standpoint as far as the stomach was concerned. They have been able to follow their usual avocations. They have gained in weight. The most striking improvement has taken place in two congenital cases—from stunted undersized children they have developed and filled out to normal proportions. While treatment with salvarsan, mercury, and the iodides has been carried out systematically in all the cases, in only one of six, in which

recent tests have been made, has the Wassermann reaction proved negative. The fact remains that the symptoms in these cases have been controlled and the patients "clinically cured" for periods extending from one and one-half to three and one-half years.

INTERALLIED SURGICAL COMMISSION ON TREATMENT OF WOUNDS.

The Surgical Commission appointed by the allied nations to discuss the treatment of wounds, and of which Professor Tuffier was appointed president, arrived at the following conclusions at its first meeting March 15:

It is desirable that the organization of service be so arranged as to permit a continuity of surgical direction in the treatment of the wounded.

In the fighting posts, and especially in the trenches, surgery should be reduced to the minimum. It must be limited to dealing with complications which may be immediately mortal and to the cleansing of wounds. The wound should neither be explored nor irrigated. It should simply be protected by a dry aseptic or antiseptic dressing.

It is essential to transport the wounded as quickly as possible to one of the large hospitals at the front which are situated at from 10 to 20 kilometers from the firing line.

It is advantageous that each of these hospitals should have one or several attached advanced annexes, nearer to the firing line, so as to quickly receive certain classes of severely wounded, those in shock or attacked by severe hemorrhage, thoracic or abdominal injuries, etc.

Generally speaking war wounds should be considered as contaminated or infected.

The object of treatment should be: (1) To prevent infection of the wound if only contaminated, or to obtain sterilization if infection is evident; (2) to permit suturing when clinical sterilization has been obtained.

Wide opening up of the wound with resection of contused tissue, removal of débris of clothing, etc., should be considered a matter of course, with exceptions only in certain cases which can be rigidly supervised.

After such intervention immediate suture is capable of giving favorable results, especially in articular wounds. It should be executed only in cases in which the wound is but of a few hours' duration (maximum eight hours), and when the surgeon can continue supervision of the patient for fifteen days.

If immediate suture is not done secondary suture must be resorted to when sterilization of the wound is sufficiently clinically evident.

Evolution of the wound should be systematically controlled by periodical bacteriological examinations which will allow the construction of a microbian curve and determine the degree of sterilization.

When there is necessity of evacuating patients whose wounds have been opened up and excised, a dressing should be applied, the action of which would continue during all the time of transport. There is need of research in this respect.

Several methods of progressive sterilization of wounds exist, which permit secondary suture regularly.—*Surgery, Gynecology and Obstetrics,* October, 1917.

THE DISTRIBUTION AMONG FOODSTUFFS OF THE SUBSTANCE REQUIRED FOR THE PREVENTION OF BERIBERI AND SCURVY.

Chick and Hume (*Journal of the Royal Army Medical Corps,* August, 1917) summarizes a valuable article on this subject as follows: To maintain a human being in a satisfactory state of nutrition the diet must contain: (*a*) A suitably proportioned supply of protein, fat, carbohydrate, salts, and water; and (*b*) an adequate amount of accessory food factors, or vitamines. Both (*a*) and (*b*) are required; excess of one cannot make good any deficiency in the other.

These necessary vitamines are (at least) of two kinds: first, the antineuritic or antiberiberi vitamine, deficiency of which in a

diet occasions beriberi; and secondly, the antiscorbutic vitamine, deficiency of which occasions scurvy.

Neither of these vitamines has yet been isolated in a pure state, and for the moment their presence can only be detected by biological methods.

These two classes of vitamines have each their individual rôle in metabolism; they possess properties different from each other and are differently distributed among natural foodstuffs.

The distribution of the antiberiberi vitamine has been investigated by study of experimental polyneuritis in birds, which is generally accepted as analogous to human beriberi. Pigeons, if deprived of antiberiberi vitamine (*e.g.*, on an exclusive diet of polished rice or white wheat flour, etc.), develop acute polyneuritis (beriberi) in fifteen to twenty-five days. The presence and relative amount of the antineuritic vitamine contained in various foodstuffs has been determined by means of curative experiments, and by preventive trials with specially selected diets. In this work the authors have extended the observations of Cooper (1913-1914) and have, in general, followed his methods.

The antiberiberi or antineuritic vitamine was found in almost every natural foodstuff examined. The principal source is in the seeds of plants—*e.g.*, cereals and pulses. The most important result emerging from the present work is the fact that in cereals the antiberiberi vitamine is mainly deposited in the germ or embryo of the grain, and to a less extent in the bran. White wheaten flour or polished rice, which consists of the endosperm (minus aleurone layer) of the grain, is deficient in this vitamine, and if employed as a sole diet will occasion polyneuritis in pigeons or beriberi in man.

Other important sources of antineuritic vitamine are the eggs of animals (*e.g.*, hen's eggs or fish roe) and yeast, or yeast extract. Milk and cheese gave disappointing results.

From the abundant presence of the antiberiberi vitamine in dry foodstuffs it is clear that this substance is resistant to drying. It can also withstand exposure to temperatures in the neighborhood of 100° C. for two hours without significant loss; if heated under pressure to or near 120° C. destruction takes place more rapidly.

The distribution of the antiscorbutic vitamine has been investigated by a study of experimental scurvy in guinea-pigs. The methods of Holst and his coworkers (1912) have been followed with some modifications. A diet of cereals with water or sterilized milk will cause death from acute scurvy in these animals within a month. The influence of various foodstuffs in preventing scurvy, when added to this "scurvy diet," has indicated where the principal sources of the antiscorbutic vitamine are to be found.

The antiscorbutic vitamine is present in active, living vegetable tissues. It is also present in animal tissues to a much less degree. Fresh vegetables and fresh fruit juices are the most valuable sources of antiscorbutic vitamine that we possess. All the dry foodstuffs examined, including desiccated vegetables, were more or less deficient in this vitamine.

Dry pulses (or cereals), though rich in antiberiberi vitamine, are deficient in antiscorbutic vitamine and afford no protection against scurvy. If these are moistened, however, and allowed to germinate, the antiscorbutic principle is regenerated with the beginnings of active cell life.

Germinated pulses are recommended as a valuable and convenient means of preventing scurvy in the absence of fresh fruit and vegetables. In the dry stage they are eminently suitable for transport, and can be moistened and germinated on the spot as required. There is given a method for preparing germinated lentils or peas under active service conditions.

It is evident from the preceding that the antiscorbutic vitamine is extremely sensitive to drying. As regards exposure to high temperatures it is also more unstable than the antiberiberi vitamine. Holst found that the antiscorbutic power of fresh cabbage was slightly lessened after exposure to 100° C. for half an hour, but that the deterioration was appreciable after one hour; at 110°

to 120° C. the destruction was rapid and complete.

It follows from this that neither the antineuritic vitamine nor the antiscorbutic vitamine may be expected to survive in tinned or sterilized foods, considering the high temperature to which these have been subjected in course of preparation.

In case of armies or other populations subsisting largely on tinned foods, it is imperative to provide an adequate supply of vitamine from outside sources.

To prevent beriberi the bread or biscuit should be made from whole meal or germ-containing flour.

To prevent scurvy, if a supply of fresh fruit or vegetables is not procurable, germinated pulses should be added to the diet.

GUNSHOT WOUNDS OF PERIPHERAL NERVES.

SHORT (*Bristol Medico-Chirurgical Journal,* No. 133, 1917) states that cases of nerve concussion should recover in from four to six weeks, whilst partial division of a nerve should go on to complete recovery in from two to six months.

When there is complete division of the nerve, with a bulbous swelling at the end of the upper segment, succeeded by a mass of scar-tissue of variable thickness, and adherent to the surrounding tissues, the treatment adopted is to free the two ends of the nerve, cut off the upper segment through the upper end of or above the bulbous swelling, so as to expose visible nerve-bundles with no excess of interstitial fibrous tissue, and suture with catgut. Many English surgeons wrap the junction in Cargile membrane; others sometimes use a segment of saphena vena, but often nothing is used.

It frequently happens that the ends cannot be brought together because of a gap of one to two inches. This is bridged by two or three plies of internal cutaneous nerve from the upper arm, but some surgeons use catgut strands, and others employ nerve-anastomosis.

There may be a bulbous swelling on the nerve adherent to the track of the bullet, and it may be doubtful whether the nerve fibers pass through it or are interrupted. In such a case we stimulate the nerve electrically above and below the bulb. If, in the case of a small or medium-sized nerve (not the sciatic), any muscles supplied by it contract, the scar is freed and wrapped in a segment of saphena vein. If there is no response, excise the scar and suture.

A large nerve, such as the sciatic, may show symptoms of a partial division, and at operation part of the nerve shows a scar. The best procedure is to take out a quadrilateral, including the scar, and, by splitting the nerve trunk up and down, to bring the two ends together, leaving the intact portion of the nerve undisturbed.

The nerve may be intact, but pressed upon by a bullet or by shattered bone. The treatment is to remove the cause of pressure, but although this relieves pain at the time, it is apt to return during the process of healing, and prove very intractable.

WOUND TREATMENT BY THE INTRODUCTION OF LIVING CULTURES OF A SPORE-BEARING ANAEROBE OF THE PROTEOLYTIC GROUP.

DONALDSON and JOYCE (*Lancet,* Sept. 22, 1917) in a report to the Medical Research Committee, which includes some clinical records, direct attention to what they call the Reading bacillus, an actively motile organism, spore-bearing, and capable of being introduced into the body of guinea-pigs by the million without causing death or any other disturbance. Nor if sown in very liberal quantities on wound surfaces does it show any pathogenicity. They observe that three main methods of wound treatment are at present in vogue: the antiseptic, the physiological, and the surgical, viz., by excision of the wound. The last-named has come into vogue because of the disappointing results obtained from the first two, on the score of their inefficiency or because of the time element.

From the physiological or hypertonic saline method has evolved as an offshoot

the salt-pack treatment of wounds, for which its advocates claim extraordinarily good results.

These include the simplicity of method, the avoidance of daily dressing of the patient, the rapidity with which the wound becomes a healthy granulating surface, the absence of secondary hemorrhage, and the rapid general improvement of the patient. All this means a considerable curtailment of the time spent by the wounded man in hospital.

Hitherto the good results have been attributed in some obscure way to the presence of the salt acting more or less on the physiological lines described by Wright; but it is felt by all who have written about salt packs that some other explanation is necessary.

They afford what they think is the true explanation of the phenomena observed, and believe that it will clear up many of the points that have hitherto been obscure.

The key to the situation depends on two observations—one clinical, the other bacteriological. The former consists in the fact that cases which smell (and the odor is one of the most characteristic features of these cases) do well, while those which do not make no headway. The bacteriological observation consists in the discovery that a certain bacillus is apparently constant in the wounds which emit the odor, while it is absent or cannot be recovered from those which do not smell.

This bacillus is a spore-bearing anaerobe of a saprophytic nature and belongs to the proteolytic group of organisms—the group which includes B. tetani and B. œdematis maligni.

Unlike these latter, it appears to be non-pathogenic to the animals experimented on, and, what is of more importance, appears to be non-pathogenic for man when introduced into wounds. Further, unlike the above-named pathogenic varieties, it does not appear to set free any toxins injurious to the patient in the course of its action on the dead tissues.

A brief outline of the morphological and cultural characters of the organism is given, its probable mode of action, and the results of animal experiment.

While it may be one that has been fully described before, the authors make no attempt in the paper to identify it with such, in view of the somewhat chaotic state of our knowledge regarding anaerobes. Hence, for convenience sake, they call it the Reading bacillus.

It acts, apparently, in virtue of its proteolytic powers only on devitalized tissue, and possibly on toxalbumins, and appears to possess no power of attacking healthy structures.

Special stress is laid on the necessity of recognizing the fact that one of the chief factors which keep a wound septic is the presence of devitalized tissue in that wound. This acts as a base from which pathogenic organisms attack the body. They would lay even greater stress on this than on the infecting organisms.

The surgical or excision treatment of wounds apparently recognizes this, but only aims at removing macroscopically devitalized tissues, and in doing so inflicts a fresh trauma liable to reinfection.

For this they propose to substitute the Reading bacillus in a living form, and it is probably present in most of the wounds if only given a chance to carry on its functions. These are directed toward the removal not only of the grossly damaged tissue, but it succeeds also in attacking the microscopically damaged structures. As a result the body forces are freed from the constant menace of septic poisoning, thus allowing them to begin the work of repair.

They give examples of gunshot wound cases which have been treated in various ways previously, including the salt-bag method, but without success. These, however, on being sown later with living cultures of the bacillus, have immediately started to do well and have ended in rapid recovery.

The organism is probably present in the larger number of infected wounds, but requires more or less anaerobic conditions before it can come into play.

These are provided by the pack method

of treatment, but the authors are inclined to think that salt is not a necessary adjuvant and plays a very small rôle, if any. This seems indicated by the fact that an inert substance like sphagnum moss for packing gives equally good results.

It is essential, however, that the wound be thoroughly well laid open in the first instance, exposing every pocket and sinus, so that the packing may completely fill the wound.

Many subsidiary points have still to be worked out, and even some of the above statements may have to be modified. The authors feel, however, that the underlying principles are sound and offer a true explanation of the phenomena which have been described by those who have used salt bags. It sounds like heresy to advocate the introduction of living organisms to a wound, and, above all, anaerobic spore-bearers, but it has been done with success by the authors. In view, therefore, of the urgent needs of the moment, they offer these results of their investigations, carried out amidst much routine work, as they feel convinced that a knowledge of them will lead to further developments, and such knowledge ought to be shared now with others who may have opportunities for the investigation of a larger number of wounds than they have.

TRENCH FOOT.

HAYDON (*Journal of the Royal Army Medical Corps,* August, 1917) notes that 240 cases of trench foot were admitted to the hospital during December, 1916, and January, 1917. Class one represented those who had almost recovered from the effects of exposure to cold. The feet were normal except for tenderness and aching at night. Warm foot-gear and rest in the hospital cured them. Class two represented slight cases which would be fit for duty in a few months. The legs were swollen following prolonged cold and wet. The swelling lasted for some days. As the swelling subsided severe pain described as rheumatism was felt in the legs. Walking was only possible with pain and difficulty. Boots could not be borne. The appearance of the feet and legs was almost normal. The general condition was unaffected. Class three represented cases with local gangrene of toes or toes and heel, but without constitutional disturbance. The toes were in some cases ultimately lost. Even beyond the area of gangrene there was no impairment of circulation.

Class four represented the septic cases, and all had more or less constitutional disturbance. There was gangrene often with extensive cellulitis. Loose stockings seemed most serviceable for these slight cases, over layers of wool, and foot coverings made of thick, warm, soft material, which came well above the ankle. Time is an essential factor in the cure of the pain and tenderness.

As to the gangrenous cases there is never any justification for immediate amputation. Conditions always improve after rest in the hospital. When the toes alone are gangrenous, with little assistance by way of operation they come away at the metatarsophalangeal joints and healing takes place, resulting in a useful foot. It is interesting to note that open ether was used as the anesthetic as long as the lungs were healthy, being preceded by an injection of morphine and atropine. The site of amputation after shaving the limb was washed with ether soap, and then with ether. When quite dry it was painted with 2-per-cent solution of iodine in rectified spirits. Ten minutes before the operation the great sciatic was injected with a 4-per-cent solution of eucaine. In some cases the skin and muscles just above the operation area were injected with the same solution. Two and a half pints of normal saline were infused either subcutaneously or intravenously at the time the operation was taking place. In some cases intravenous antiseptics were added to the infusion, and subcutaneous injection of thirty cubic centimeters of polyvalent antistreptococcal serum was given.

As to prophylaxis, the author states that loose-fitting boots should be worn over thick, warm socks. Moreover the feet should be kept clean, and regular physical

exercise is indicated to retain the tone of the vascular system. It is stated that the wearing of puttees predisposes to frost-bite since they constrict the legs, more especially when they become damp and the material shrinks. In many of the worst cases admitted puttees have been worn.

The perusal of the article suggests that the author is a profound believer in the doctrine of "doing everything."

FOURTH ANALYSIS OF CASES OF TETANUS TREATED IN HOME MILITARY HOSPITALS.

BRUCE (*Lancet*, Sept. 15, 1917) supplements his previous papers on this subject by the present one covering part of October and November and part of December, 1916. In the third analysis it was stated that the intention was to publish each series of 100 cases as they occurred, and the present paper deals with the first 100 cases completed since the last analysis was written. The number of cases of tetanus dealt with in the four periods and the rate of mortality are as follows:

1914-15—231 cases; 98 recovered, 133 died; mortality of 57.7 per cent.
1915-16—195 cases; 99 recovered, 96 died; mortality of 49.2 per cent.
Aug.-Oct., 1916—200 cases; 127 recovered, 73 died; mortality of 36.5 per cent.
Oct.-Dec., 1916—100 cases; 69 recovered, 31 died; mortality of 31.0 per cent.

It is shown that if the symptoms of tetanus appear within ten days of receiving the wound the mortality was 83.3 per cent; if between the eleventh and twenty-fourth day, 29.6 per cent; the remaining cases with a longer incubation of 25 to 190 days, 16 per cent.

Examining 100 cases under observation, 61 could be placed in the general and 28 in the local group; in 11 it was doubtful to which group they belonged, or if the cause of the death was tetanus. All the cases of localized tetanus recovered. As in the previous fracture cases there were 36, with 11.4 per cent mortality. In 15 cases in which tetanus followed an operation were six deaths, a mortality of 40 per cent, and in only two of these was a prophylactic inoculation given before operation. The Tetanus Committee advises that when operations are performed at the site of wounds, even if they are healed, a prophylactic injection of serum should invariably be given.

There were two cases in which an operation was carried out on the wound after the appearance of symptoms of tetanus. Both recovered. Since the beginning of the war there have been 52 cases of this kind reported, with a mortality of 40 per cent.

The opinion of the Tetanus Committee is that it appears to be safer to abstain from surgical interference with the wound until the ordinary treatment for tetanus has been carried out, unless there exist other and imperative reasons for immediate operation. When the symptoms of tetanus have subsided, and the tissues are flooded with antitoxin, then the wound can be opened up and searched for foreign bodies or hidden collections of pus and tetanus bacilli.

Among the 100 cases 61 are noted as having received a prophylactic injection of antitetanic serum in France. Ten cases are reported to have received secondary prophylactic injections in home hospitals. It is evident that the recommendations of the Tetanus Committee regarding these secondary injections were only beginning to bear a promise of fruit at the end of 1916. Of these 61 cases 51 recovered and 10 died, giving a mortality of 16.4 per cent. Of the remaining 39 cases there is no record of prophylactic treatment in 22, although in all probability many of them received it. Of these 22, 12 recovered and 10 died—a mortality of 40.5 per cent. The remaining 17 cases are stated to have had no prophylactic injection of any kind. Of these, six recovered and 11 died—a mortality of 64.7 per cent.

Of the 42 cases inoculated on the day of wound the average incubation period was 48 days. Of the 17 cases which are reported to have received no prophylactic inoculation the average incubation was 14.3 days.

The Tetanus Committee has laid down that four prophylactic injections should be

given to every wounded soldier at intervals of seven days. In the 100 cases under review the case mortality was 31 per cent. It will be remembered that only 61 out of the 100 cases were recorded as having received a prophylactic injection in France.

A table is given showing that one prophylactic inoculation is more potent than two, three, or four, but the numbers are small.

Out of the total 100 cases the number treated with antitetanic serum after the onset of symptoms was 98. Two cases did not receive therapeutic treatment with antitetanic serum in England; one recovered, one died. The patient who recovered is reported to have had a prophylactic injection on the day of wound; of the one who died there is no record. The man who recovered showed symptoms of tetanus after an incubation of 63 days; he had opisthotonos but no trismus. The symptoms lasted for three days. He was treated with nux vomica and strychnia. There is no reason given for his not having received specific treatment. The man who died showed symptoms of tetanus on November 5 and died four days afterward. Very few details are given in his tetanus report, but it is evident that antitetanic serum was not given owing to failure to diagnose the disease in time. On October 30 an amputation of the affected leg was performed, but no prophylactic injection was given at the time. It is evident that in these two cases the recommendations of the Tetanus Committee were not followed.

Of the 98 cases which received serum treatment 68 recovered and 30 died. Mortality, 30.6 per cent.

The Tetanus Committee in its Memorandum is of opinion that "in acute general tetanus the best method of treatment lies in the earliest possible administration of large doses of antitoxin serum by the intrathecal route."

It would appear from a table given that no advantage in favor of intrathecal injections emerges from the figures, as seemed to be the case in 1914-15. The numbers are too small, but are given in order to make the different analyses comparable. It must also be noted that it is the severe cases which are treated by the intrathecal route, the slight cases by the intramuscular or subcutaneous. As is shown elsewhere, cases of localized tetanus tend strongly to recovery, and it is in these cases that intramuscular injections are given. It is, in fact, so laid down in the Memorandum on Tetanus: "In the chronic forms of tetanus, particularly the form of localized tetanus limited to one limb, without trismus or other sign of generalization, there appears to be no need to resort to intrathecal injection. A course of serum treatment by the intramuscular method will, in most cases, do all that is required."

It may be thought that an apology to the reader is demanded for bringing up figures that prove nothing. But it may be urged that the same figures give information of some kind or another; for example, it is shown that in the latter part of the year 1916, 98 per cent of cases of tetanus were treated in England by antitoxic serum, and in 75 per cent the serum was inoculated intrathecally. This is of some interest today, and may be of more interest in the future.

It is evident that no case either for or against the intrathecal route can be made out from these figures, and again, as in the last analysis, it would appear better to defer treatment for one or more days after the onset of the disease. This probably only means that the severe cases are treated at once; the less severe are dallied with.

In the 100 cases of tetanus under review the mortality was 31 per cent.

The ratio of the number of cases of tetanus to the wounded has fallen greatly since the beginning of the war, due in all probablity to a great extent to the introduction of prophylactic injections of antitetanic serum.

The incubation period tends to become longer, hence there are only 12 cases reported with an incubation of ten days or under.

Only ten cases are reported to have re-

ceived secondary prophylactic injections of antitetanic serum in home hospitals.

In regard to the therapeutic effect of antitoxic serum the evidence is still inconclusive.

The rate of mortality in generalized tetanus is 34.4 per cent, in localized tetanus 0.0 per cent.

CANCER OF THE SKIN.

RAVOGLI (*Urologic and Cutaneous Review*, October, 1917) revises the classification of Thiersch from the clinical standpoint—*i.e.*, in superficial or discoid, or deep-seated or nodular, and papillary or vegetating cutaneous cancer.

A superficial epithelioma may begin on a small, hard gray nodule, in some part of the face, sometimes alone, usually multiple. They remain for years with little or no change, may even sometimes disappear. In most of the cases the small growths increase in size, the center sinks and becomes excoriated from scratching or from rubbing with towels. At this point a small superficial ulcer is formed, which is covered with dark-greenish crusts; the edges are hard and irregular. The central ulceration may heal, but usually recurs, becomes larger, with a red granular base, and scanty purulent secretion. Sometimes the ulcer in its progress may heal in the center, spread at the edges, and form an irregular ulcerated surface.

In the beginning the progress of the affection is slow, but after some time, when deeply seated tissues are involved, destruction is absolutely horrible. It invades the orbit, destroys the skin, the eye, the nose, the malar bone, the upper jaw.

A variety of cancer which has its seat toward the glabella, near the eyes, spreading on the forehead, or on the temporal region, has been called rodent ulcer. It affects the periosteum, the bones, yet never produces metastasis, remains for a long period, without invading the lymph-glands, and without producing cachexia. Some kinds of cancer are developed in the shape of red-brownish nodules, of the size of a split pea, which can be referred to a nodular or deep-seated cancer. They slowly grow to certain dimensions, and then break down. Fordyce found under the microscope that these growths contained proliferating bands, tubular processes, and acinous-shaped masses of small epithelial cells, corresponding to those of the basal layer of the epidermis. He claims that the proliferating masses of cells being surrounded by columnar cells are thus limited in their rapid growth.

The skin which shows multiple epitheliomata has suffered some changes. It has hard patches in different places of the face and back of the hands, rough, brown-red colored, somewhat scaly, associated with an itching sensation. In old persons it is known as senile keratosis, in younger persons is called xeroderma. It is, however, nothing else, as pointed out by Hartzell, than a precancerous keratosis. On these rough patches, which show the opening of the sebaceous glands, some dirty yellowish, greasy concretions are formed. When the crusts are removed a warty surface is underneath, which readily bleeds. After some time the surface is somewhat depressed, and shows an open cancerous ulcer with a hard base and elevated edges. Other small epitheliomata are developed on the other keratosic patches, and these persons may show as many as five or six epitheliomatous ulcers in different degrees of development.

Severe cases of this type are seen in those who are exposed to the heat, to the sun, to the rain, and sea water, causing what is called "sailors' cancer." In young persons with keratosic changes of the skin, having the face darkly pigmented, with abundant freckles, the skin shows rough, hard patches, which grow in the form of flat nodules and end in multiple epithelioma. This condition is known as xeroderma pigmentosum.

Senile ulcerations of the skin, pigmented moles, papillomata, angiomata, predispose equally to malignant new growths. The horny layer of the epidermis gets hard, thick, produces no pain, itches, and the patient scratches. It is then excoriated and assumes a warty appearance, covered with

a thick, adherent black crust. It gradually assumes a destructive character. Nobody can deny that Paget's disease of the nipple is a precancerous condition. It is a kind of moist eczema, superficial, slightly scaly or covered with superficial crusts, which remains for years, rebellious to treatment. It is usually followed by cancer of the mammary glands.

Hartzell, arguing on his clinical and histological observations, maintains that most epitheliomata are developed on a skin which has previously shown patches of keratosis. The principal feature of this initial keratosis is the presence of vacuolated cells, which have been found in keratosis follicularis, in Paget's disease, and in Bowen's dermatosis. This condition was afterward referred to as a diskeratosis of the epithelial cells. It would take up too much time to engage in a discussion on the entity of precancerous dermatoses.

That a peculiar seborrheic keratosis precedes, accompanies, and forms the ground where cutaneous cancers are developed is undeniable. For this reason the author does not hesitate to call this condition precancerous, and treat these patches accordingly in order to prevent the production of cancer.

Papillary carcinoma is nothing more than an advanced stage of any cancerous growth. It is the result of a quick proliferation of the papillæ under the continuous irritation of the epithelial cells from the Malpighian layer. It is an achantosis, and is found more frequently in those ulcerated cancers exposed to irritating causes, as in the cancer of the penis, of the inferior lip, of the cheeks, etc. It is only a secondary condition of any ulcerated cancer. These cancers grow from their base, gradually affect the underlying tissues, fasciæ, muscles, cartilages, bones, causing their decay and destruction.

Blastomycosis, dermatitis, coccidioides, sporotrichosis of the tuberculoid type, may all be mistaken for cancer. Taking into consideration the date, the soft feeling of the edges, the small miliary abscesses surrounding the ulcerations, will give a good hint as to a clinical diagnosis. The finding of the parasites, blastomyces, and sporotrichon under the microscope will make for certainty in the diagnosis.

Biopsy has great value in the diagnosis of the cancer, and especially for visceral cancer it is an invaluable guide to the operator. In cutaneous cancer there is, however, an objectionable feature to the removal of pieces of the growth, as it is known that incomplete operations on cancer cause much more rapid development, and early metastasis. With Olson the author believes that in the danger of metastasis following the removal of a small piece of the tumor for biopsy there is a great deal of exaggeration. In any form of growth to have the certainty of the diagnosis is invaluable, because it removes all doubt that might cause useless delay.

The majority of cancers start from the prickle-cell layer of the stratum Malpighii, making its way between the connective tissues of the papillary derma. The epithelial cells of the basal layer of the epidermis form also the kind of carcinoma which is known as ulcus rodens. The distinction of squamous cell, and of basal cell carcinoma, is considered as important from the prognostic point of view. The squamous-cell carcinoma is more infectious, travels quickly, and affects the lymph-glands, causing metastasis. The basal cell carcinoma may remain for many years, producing slow destruction in the locality, without spreading by metastasis.

The destruction of the growth by any means has to be attained. Excision seems to be the best way to deal with cancer, but it is not sure and is not applicable in all cases. The operation does not save from relapse, which is frequent. This observation had not escaped the attention of the French surgeons, who thought that at the edges of the cut some germs remained, which later on caused the relapse. For this reason the resulting wound was washed with a solution of bichloride of mercury, or with chloride of zinc, or burned with the actual cautery or with caustics, as recommended.

Carbon dioxide has been used in some cases with success, in some others with bad results.

Arsenical paste has been used for many years. Hebra used with good results the Cosme paste, which is made with arsenic and cinnabar. Hebra pointed out the elective action of arsenic on cancer tissues. But on account of the pain produced by the application, and of the resulting inflammation, the method was abandoned. It is only used by some "cancer doctors," and at times with good results.

Formaldehyde in its normal strength is a powerful parasiticide; the epithelial cells are made dry, lose their keratine, and fall off, or, necrotized, hang to the tissues in a sort of yellowish thick mass. Normal tissues are not severely affected by formaldehyde, and after the necrotic mass has sloughed off the separation of the tissues is complete and only a very superficial scar remains. Formaldehyde is diffusible, and even in mild solution for sterilizing purposes causes dermatitis, which in some cases is stubborn and resembles an *x*-ray dermatitis.

The use of lysol on lupus erythematosus, lupus vulgaris, and tuberculosis verrucosa cutis showed that its beneficial action was due to the coagulation of the plasma in the connective tissue elements, in the plasma cells, which form the body of the tubercular tissues, which are also found around the cancerous alveoli. This condition produces a necrosis of the connective tissues; they turn yellowish in color like a pulpy mass adherent to the ulcerated surface, which gradually is sloughed off. This prompted the idea of mixing the remedies together and by this means accomplishing the treatment of the epithelioma, using formaldehyde to destroy any possible parasitic elements and to disorganize the epithelial infiltrating cells, and the lysol to affect the hyperplastic connective tissues surrounding the epithelial cells. A mixture of formaldehyde and lysol was used for some time with satisfactory results. After the application of this mixture blood and serum oozed from the wounded surface. The application of perchloride of iron to stop the bleeding prompted the author to mix it with the formalin and lysol.

The mixture has to be prepared at the moment of using.

Formaldehyde, 2 parts;
Lysol, 2 parts;
Ferric perchlorid., 1 part.

This forms a thick greenish mixture, which can be applied on a piece of cotton or on cotton twisted on an applicator. It is necessary to be careful not to spill the fluid on the healthy skin. Also when operating near the eyes, nose, or mouth, pads of cotton or gauze have to be used in order to prevent the fumes of formaldehyde from irritating the mucous membranes. When the mixture is allowed to remain a few hours in an open glass it turns to a dark-brown color and loses its efficacy.

When operating on the surface of the epithelioma of the skin or of the mucous membrane it is thoroughly washed with green soap and water. All crusts and secretions are completely removed. A 5-per-cent solution of cocaine or ethyl chloride is applied to prevent pain. With a sharp curette the cancer is scraped off until by passing the finger over the surface it is felt to be perfectly smooth. In scraping care has to be taken to remove all hard particles from the edges and also from the bottom of the growth. If the curette cannot remove all, then the scissors will finish the work. In the writer's experience the curette is the great instrument to remove cutaneous cancer. It removes only the diseased tissues, scrapes out from the connective tissues the nests of granulations of epithelial cells, which will never withstand its action. When the surface has been entirely cleaned of all diseased particles, and when passing the finger over the surface it is perfectly smooth, cotton saturated with solution of cocaine 5 per cent is again applied for a few minutes longer. The surface is dried with sponge, and a tampon saturated with the mixture of formalin, lysol, and perchloride of iron is applied. In the same way when the cancer has caused a hole in the tissues the tampon is applied inside, and the con-

tiguous parts are protected with pads of cotton. In a case in which the cancerous nodules had affected the conjunctiva of the left eye, the conjunctiva was scraped with the curette and the mixture was applied without any injurious effect to the eye. The time to keep the application on varies with the depth and the extent of the cancer. In the ordinary superficial flat cancer of the face and hands, five minutes is sufficient to destroy all the infiltration which still remains. In cases in which the cancer has grown deep the cotton saturated with the mixture is left until the following day. To relieve pain the surface is washed with alcohol.

On the following day the surface of the wound is covered with an abundant yellowish necrotic mass. This remains from eight to fourteen days, gradually sloughing off from the periphery toward the center, while the surface is healing up. There is no formation of pus, but the secretion is due to an exudation of serum mixed with detritus of the necrotic tissues.

Sometimes the application of the formaldehyde mixture is repeated after eight or ten days until the surface has perfectly healed up.

For dressing the resulting wound a salve is made of

Ichthyol, 1 drachm;
Unguent. diachylon Hebra, 1 drachm.
M.

This is spread on a piece of gauze and applied covering the surface. This plaster covers and protects the wound, favors the sloughing of the necrotized tissues, and prevents the formation of crusts.

In two cases of rodent ulcer of the forehead, in one with affected bone, by repeated applications, results were obtained which could scarcely be expected.

When, however, the carcinoma has affected the loose tissues, the subcutaneous connective tissues, fasciæ, with involvement of the lymphatic glands, then the case cannot be helped by any other means than a radical surgical operation, which may even not be beneficial.

REVIEWS.

MEDICAL DIAGNOSIS. For Students and Practitioners. By Charles Lyman Greene, M.D. Copiously illustrated. P. Blakiston's Son & Co., Philadelphia, 1917. Price $10.00.

The title-page of this book does not contain the statement that it is a fourth edition of Dr. Greene's "Diagnosis" because he has practically rewritten the volume, making it much larger and more comprehensive than ever before. In other words, he has extended his original text until it now becomes an exhaustive treatise on this subject, containing thirteen hundred pages and dealing not only with physical diagnosis but with the methods of laboratory diagnosis in regard to the blood, urine, and other fluids of the body, and indeed all diagnostic aids which can come to the physician in the study of disease. On the margin of each page, opposite each paragraph, there is a brief statement summarizing the contents of that paragraph.

The book properly begins by dealing with the outward signs of disease, then takes up fever and thermometry, coma and its congeners, the phenomena and significance of pain, and follows with chapters upon the examination of the blood, and a discussion of the various anemias. There are other chapters upon diseases of the glands of internal secretion, the kidneys, and the thoracic disorders and diseases, as well as those of the upper respiratory tract. After this there is a discussion of cardiovascular diseases, including the uses of the various instruments of precision which are now much employed, including the electrocardiograph and *x*-ray. Next disorders of the digestive system are brought forward, with a description of the methods of examining gastric and other digestive secretions and the feces. By natural sequence he proceeds to the discussion of the glands nearly related to the digestive system, and then takes up

the infectious diseases and infestations. Last of all he considers nervous diseases and feigned states.

The index, which is printed in fine type, covers almost one hundred pages, from which it can be seen that the reader can easily turn to any part, from which he desires information, with ease. Whenever the author feels that special emphasis is to be placed upon certain statements he puts these statements in italics or in heavy-face type.

The book is one to which many pages might be devoted in the way of critical review, and it deserves praise. While the author does not hesitate to quote other authors and use illustrations from their works, when he considers them typical, nevertheless the book contains, from beginning to end, a distinct mark of his own personal opinions. It is really a very notable contribution to American medical literature, and reflects credit not only upon its author but upon the profession in which he has for a long time been a distinguished member.

NOTES FOR ARMY MEDICAL OFFICERS. Medical War Manual No. 2. By Lieutenant-Colonel T. H. Goodwin, R.A.M.C. With an Introductory Note by Surgeon-General William C. Gorgas, U. S. Army. Illustrated. Lea & Febiger, Philadelphia, 1917. Price $1.00.

It is the intention of the General Medical Board of the Council of National Defense to have published a series of these small books. One of them, by Dr. Vedder, of the U. S. Army, on "Military Sanitation," has already appeared and been noticed in these columns. This small book is the outcome of a series of lectures delivered at the Army Medical School in Washington by Colonel Goodwin, who is a distinguished member of the British Army Medical Corps, and was medical officer in charge in the first English expeditionary force sent to France early in the present war. As some of the readers know, he is at present on duty at Washington in order that our Army may have the benefit of his large experience.

The book is exactly what its title-page indicates, in that it is designed to tell a medical officer just what he should do in camp and in battle. Covering only a little over a hundred pages and of such a size that it can be carried in the breast pocket of a military coat it is essentially a *vade mecum*. Without doubt all of the medical men in the U. S. Army will be glad to become possessed of it, not only because it contains much valuable material, but also because it is compiled by one who wears the D. S. O. of his government.

THE MEDICAL RECORD VISITING LIST FOR 1918. William Wood & Company, New York, 1918.

For many years we have called attention to the Medical Record Visiting List which annually makes its appearance at about this time. On one occasion we stated that it was one of the best of its kind, and this still holds true. Indeed, one of its forms now differs from most of the other Visiting Lists in that it is dated, whereas at least two of the other Visiting Lists that have been published for 1918 are no longer dated but run along, except that the days of the week are printed on the pages. We understand that some physicians like a list for thirty patients per week with dates, and some prefer one without dates. This visiting list costs $2.50 for thirty patients a week, with or without dates, in a calfskin wallet, without a flap, and $3.00 in a calfskin wallet with a flap. For sixty patients a week the price, without a flap, is $3.00, and for sixty patients a week, with a flap, $3.25. In sealskin the price is respectively $3.00 and $3.50 for thirty patients, and $3.25 and $4.00 for sixty patients, with or without dates. This "List" has, in an abbreviated form, much valuable information, for in its first few pages are found obstetric calendars, doses, poisons, and other points of interest.

ELEMENTS OF HYGIENE AND PUBLIC HEALTH. A Text-book for Students and Practitioners of Medicine. By Charles Porter, M.D., B.Sc., M.R.C.P. Illustrated. Oxford University Press, New York, 1917. Price $4.15.

This book, which is prepared by the medical officer of health of one of the metropolitan boroughs of London, who is also an examiner in public health in the University of Edinburgh, and who is the author of a number of books or pamphlets dealing with

cognate subjects, has been prepared because he felt that medical men should have a greater interest in, and a greater knowledge of, disease prevention and health preservation than is the case. The author modestly states in his preface that there is nothing particularly original in the contents of his volume except that its plan differs to some extent from that generally adopted in other text-books on public health, and that the view-point is not quite the same as that taken by a majority of authors dealing with this subject.

There are altogether 28 chapters dealing with personal hygiene, public health and disease, tropical diseases, animal parasites, occupational diseases, offensive trades, climatology, disposal of the dead, food, air, soil and water, and the removal of sewage. The concluding chapters deal with public health administration, sanitary laws, and vital statistics. There are 98 illustrations.

The book does not pretend to be one of the exhaustive text-books dealing with this subject. It is a concise and clear presentation of what the physician and student ought to know in regard to the subjects covered in the chapters we have named. It may be called, in other words, a handy volume not overburdened with a few statements, but containing a large amount of information well boiled down.

THE PRACTICAL MEDICINE SERIES. Edited by Charles L. Mix, A.M., M.D. Volume 6. General Medicine, Edited by Frank Billings, M.D., Assisted by B. O. Raulston, M.D. Price $1.50.

This small volume, which, nevertheless, contains 336 pages, provides a summarization of the literature in medicine which the editors have thought worthy of preservation during the year 1916. A few illustrations are included. The dearth of foreign literature is notable, not through any lack of attentiveness on the part of the editors, but because foreign journals are not received or, possibly, have not been published. The print is of good size and easily read. We have often in the past spoken well of this series.

SURGICAL NURSING IN WAR. By Elizabeth R. Bundy, M.D. Illustrated. P. Blakiston's Son & Co., Philadelphia, 1917. Price 75 cents.

This excellent manual, which is sold at the moderate price of seventy-five cents, after a preliminary discussion as to the most important needs, takes up the question of missiles used in modern warfare and their immediate effects; a brief but excellent description, including also the dominant infections and the underlying rules of bacterial infection and immunity. Crile's teaching concerning shock is accepted. It is defined as a condition of brain exhaustion and abnormally low blood-pressure.

Under Surgical Dressings are discussed the usual antiseptics, including hypochlorous acid and a description and illustrations of the Carrel technique. Even the latest and most promising of all antiseptics, dichloramin-T, is included; also the present highly popular English dressing B. I. P.—that is, bismuth, iodoform, and paraffin; nor are Sir Almroth Wright and his treatment neglected. There is an excellent chapter devoted to the wounded man. The Thomas knee splint receives its proper recognition. The Balkan frame is pictured. There is a chapter devoted to the teeth, tetanus, burns, and ambrine, the ambrine method of treatment of burns being fully described. A chapter is devoted to injuries of the head, another to the neck and spine, and one to the chest and abdomen. The final chapter deals with trench diseases and aviation headache.

A book thoroughly to be commended and serviceable, not only to the nurse, but to the doctor.